EasySync Ltd

ES-DLA-8/16

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1 Introduction 4
1.1 Package Contents 4
1.2 Logic Analyzer Hardware 5
1.3 Hardware Specifications 7
1.4 Software Specifications 7
1.5 System Requirements 8
1.5.1 Operating System Requirements 8
1.5.2 Hardware System Requirements 8
2 Setting up the Instrument 9
2.1 Software Installation 9
2.1.1 Windows 9
2.1.2 Mac OS X: 12
2.2 Device Driver Installation 16
2.2.1 Mac OS X 16
2.2.2 Windows 17
2.3 Hardware Setup 21
2.4 Installation Complete 22
3 Using the ES-DLA-8/16 23
3.1 Connect to the ES-DLA-8/16 Device 23
3.2 Log Data 23
3.3 Set Trigger Conditions 24
3.4 Finding Data or Signal Patterns 26
3.5 Analyze and Decode Result 26
4 User Interface 27
4.1 Main Area 28
4.1.1 Set Trigger Conditions 28
4.1.2 Configure Channel Name and Data Display Color 29
4.1.3 Use Mouse Scroll Wheel to Resize 29
4.2 Tree View 30
4.2.1 Combine Channels to Form a Bus 30
4.2.2 Delete a Bus or All Buses 31
4.3 Scale Area 32
4.4 Snapshot Area 33
4.5 Protocol Analyzer 34
4.5.1 I2C Decoder 35
4.5.2 One Wire Decoder 36

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4.5.3 SPI Decoder 36
4.5.4 UART Decoder.....38
4.6 Menu and Quick Access Buttons 38
4.6.1 File Menu and Related Quick Buttons 39
4.6.2 View Menu and Related Buttons 40
4.6.3 Device Menu and Related Buttons.....41
4.6.4 Search Menu and Related Buttons 47
4.6.5 Protocol Analyzer and Related Buttons 50
4.6.6 Help Menu and Related Buttons.....50
5 Contact Information 51
Appendix A - List of Figures 52
Appendix B - Revision History 55

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1 Introduction

The EasySYNC ES-DLA-8/16 is an 8/16-channel logic analyzer which connects to the computer using USB. When combined with the free, downloadable EasyLogic software, if offers a cost-effective yet simple-to-use solution for electronics design & verification.

1.1 Package Contents

The following components are included in the package. Ensure all items are included in the package before discarding the packing materials.

- USB logic analyzer unit
- Test clip harness
- Quick-start guide
- Carrying bag
- USB cable

Note: For the 8-channel version, the package will contain a single harness with 10 clips. For the 16-channel version, the package will contain two harnesses, giving 20 clips in total.

The logic analyzer and test clips are shown below:

Figure 1-1: Logic Analyzer package contents

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1.2 Logic Analyzer Hardware

The logic analyzer hardware is shown below. The main external components are the Logic Probe connector, the status LED and the USB connector.

The status LED indicates that the analyzer is successfully enumerated on the computer (connected to the USB port and the driver installed).

Note that there is no separate power connector as the analyzer is powered through the USB connection.

Figure 1-2: Logic Probe connections (ES-DLA-16 shown) and Status LED

Figure 1-3: Rear panel showing the USB connector

Figure 1-4: Front panel showing the ES-DLA-8 and ES-DLA-16 Logic Probe connectors

The pin out of the logic probe connector is summarised below in Figure 1-5 and Table 1-1.

Note: Figure 1-5 and Table 1-1 show the pin functions for the 16-channel analyzer. For the 8-channel analyzer, only the pins shown on the upper row are used.

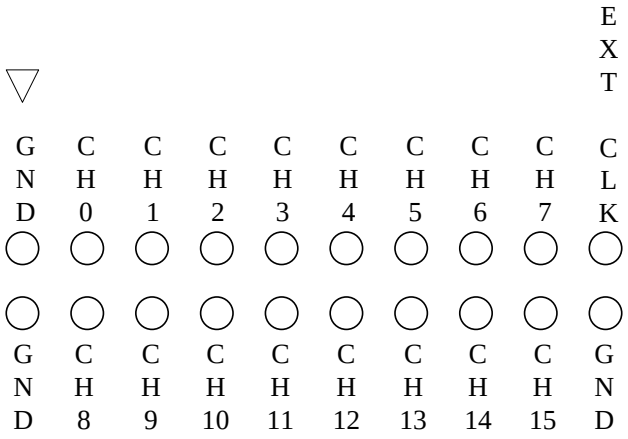

Figure 1-5: Pin names (looking into the connector as in Figure 1-4)

Models		ES-DLA-8	ES-DLA-16
Upper	GND	Y	Y
	CH0-7	Y	Y
	EXT CLK	Y	Y
Lower	GND	×	Y
	CH8-15	×	Y
	GND	×	Y

Table 1-1 Functional Pins in ES-DLA-8/16

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1.3 Hardware Specifications

- Number of Channels: 8 (ES-DLA-8 model) or 16 (ES-DLA-16 model)
- Capture clock: external clock and internal clock
- Internal capture uses internal clock programmable for rates up to 60MHz (RLE or 4bit raw)
- Data capture modes: Raw data or RLE (Run Length Encoding)
- Maximum input voltage: -0.5 … +5.25V DC
- Input Overvoltage protection: +/-20V (see note below)
- CMOS standard voltage thresholds
    - Logic Low -0.5 … +0.8V
    - Logic High +2.0 … +5.25V
- Hardware upgradeable over USB
- Bus Powered USB Interface (60mA)
- Instrument carrying bag included
- Attractive enclosure with compact dimensions
- Dimensions - W: 40mm x H: 10mm x D: 53mm

Note: the analyzer is protected against overvoltage up to +/- 20V but is not designed for continuous operation outside of -0.5 to +5.25V

1.4 Software Specifications

- Trigger modes:
    - Rising Edge
    - Falling Edge
    - High Level
    - Low Level
- Maximum number of samples: 1 Billion
- Pre-Trigger Mode: 0%, 25%, 50%, 75% and 100%
- Protocol Analyzer: I2C, SPI, OneWire and UART decoders.
- Windows and Mac OSX versions

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1.5 System Requirements

This section details the basic operating system and hardware requirements for the Logic Analyzer. Note that the software and hardware capabilities of the analyzer may vary depending on PC configuration. This manual assumes proper installation of a supported operating system as listed below.

1.5.1 Operating System Requirements

	Support
Operating System	Windows XP, Windows Vista, Windows 7, Windows 8 32-bit or 64-bit operating system; Mac OS X 10.7~10.8

Table 1-2 Operating Systems Requirements

1.5.2 Hardware System Requirements

Hardware Name	**Lowest Minimum Configuration**	**Recommended Configuration**
CPU	1 GHz	2 GHz
Memory	1.5GB	2GB
Display Devices	VGA Display Capability with 1024x768 resolution or higher.	VGA Display Capability with 1024x768 resolution or higher.
Hard Drive	At least 100MB available space	At least 100MB available space
USB	USB 1.1 supported	USB2.0 recommended

Table 1-3 Hardware Requirements

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2 Setting up the Instrument

This section describes the installation of the logic analyzer. The main steps are:

- Install the device software
- Connect the hardware
- Connect the Logic Probes to the Device Under Test

Each of these steps is covered in detail below. There are separate sections for the PC and Mac.

2.1 Software Installation

The analyzer should not be connected to the USB port yet. Before connecting the analyzer to the computer, the EasyLogic program should be installed.

2.1.1 Windows

Start the installation by double-clicking the installation package, the following screen will appear.

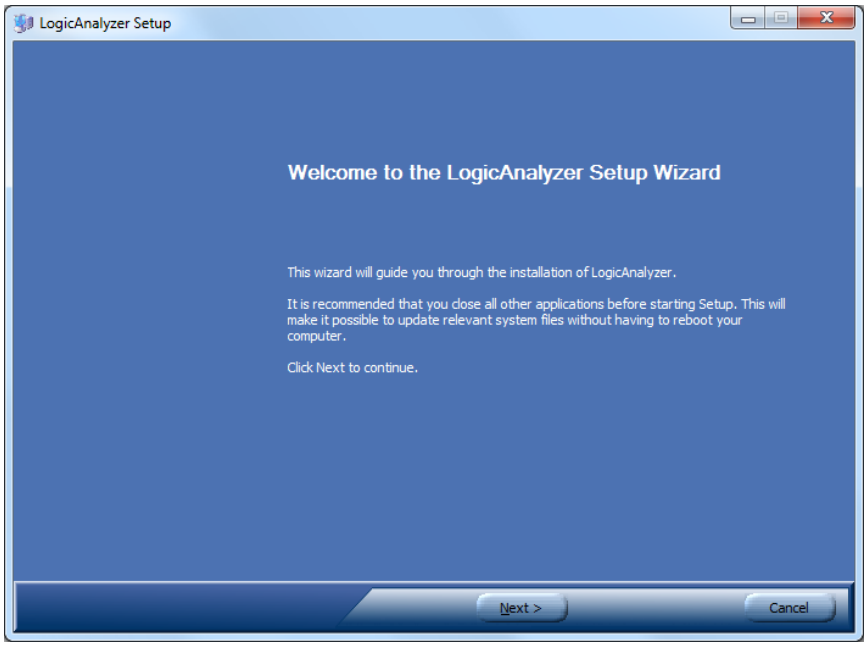
LogicAnalyzer Setup
Welcome to the LogicAnalyzer Setup Wizard
This wizard will guide you through the installation of LogicAnalyzer.
It is recommended that you close all other applications before starting Setup. This will make it possible to update relevant system files without having to reboot your computer.
Click Next to continue.
Next >
Cancel

Figure 2-1 Application installer welcome screen

Click on the “Next” button to proceed to the License Agreement screen.

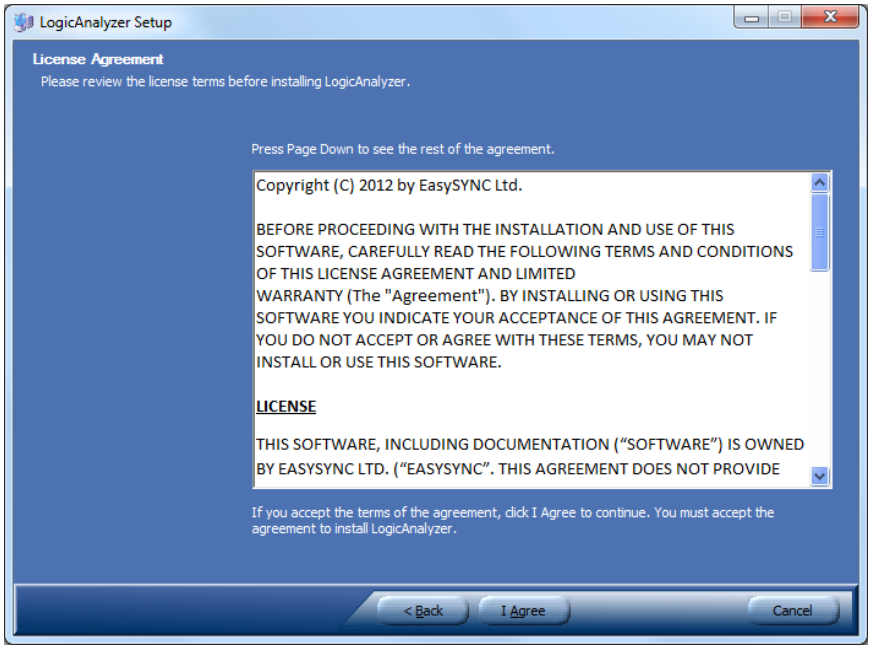
LogicAnalyzer Setup
License Agreement
Please review the license terms before installing LogicAnalyzer.
Press Page Down to see the rest of the agreement.
Copyright (C) 2012 by EasySYNC Ltd.
BEFORE PROCEEDING WITH THE INSTALLATION AND USE OF THIS SOFTWARE, CAREFULLY READ THE FOLLOWING TERMS AND CONDITIONS OF THIS LICENSE AGREEMENT AND LIMITED WARRANTY (The "Agreement"). BY INSTALLING OR USING THIS SOFTWARE YOU INDICATE YOUR ACCEPTANCE OF THIS AGREEMENT. IF YOU DO NOT ACCEPT OR AGREE WITH THESE TERMS, YOU MAY NOT INSTALL OR USE THIS SOFTWARE.
LICENSE
THIS SOFTWARE, INCLUDING DOCUMENTATION ("SOFTWARE") IS OWNED BY EASYSYNC LTD. ("EASYSYNC". THIS AGREEMENT DOES NOT PROVIDE
If you accept the terms of the agreement, click I Agree to continue. You must accept the agreement to install LogicAnalyzer.
< Back
I Agree
Cancel

Figure 2-2 License agreement

If you agree with the terms and conditions of the License Agreement, click on "I Agree" button, otherwise click on the "Cancel" button. Agreeing to the terms and conditions will bring up the following screen.

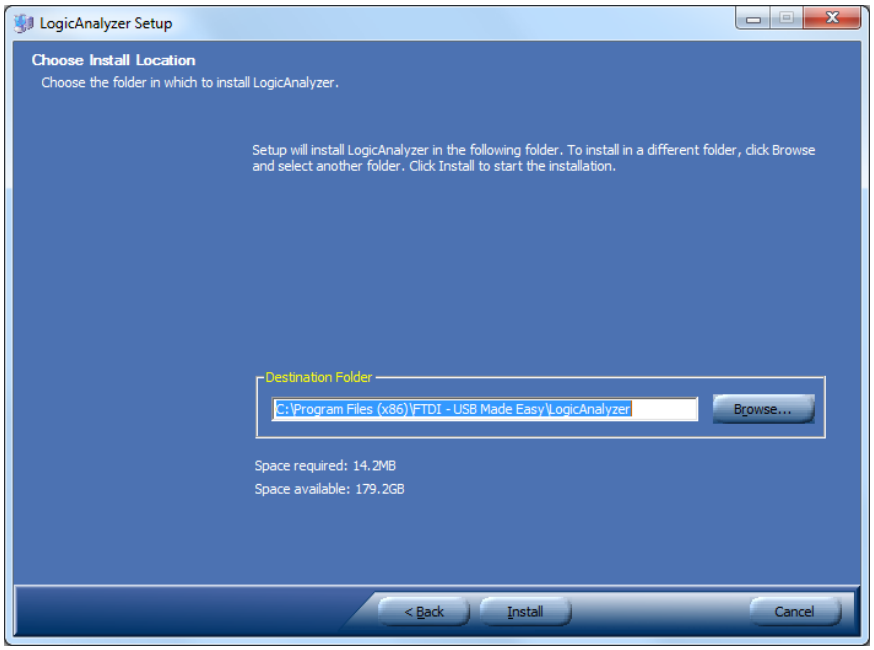
LogicAnalyzer Setup
Choose Install Location
Choose the folder in which to install LogicAnalyzer.
Setup will install LogicAnalyzer in the following folder. To install in a different folder, click Browse and select another folder. Click Install to start the installation.
Destination Folder
C:\Program Files (x86)\FTDI - USB Made Easy\LogicAnalyzer
Browse...
Space required: 14.2MB
Space available: 179.2GB
< Back
Install
Cancel

Figure 2-3 Install location

Select the directory in which to install the EasyLogic software. A default directory is already selected but can be changed in this window. Click the "Install" button to continue the installation process.

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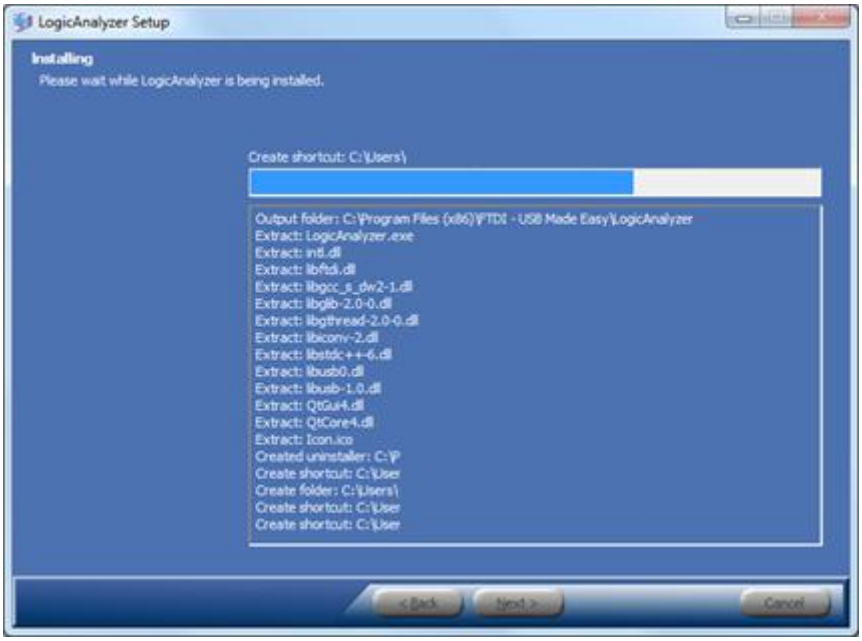

Figure 2-4 Copy files

As shown above, a progress screen will appear as the files are installed. Installation may take a few seconds. Upon successful installation, the following screen will appear.

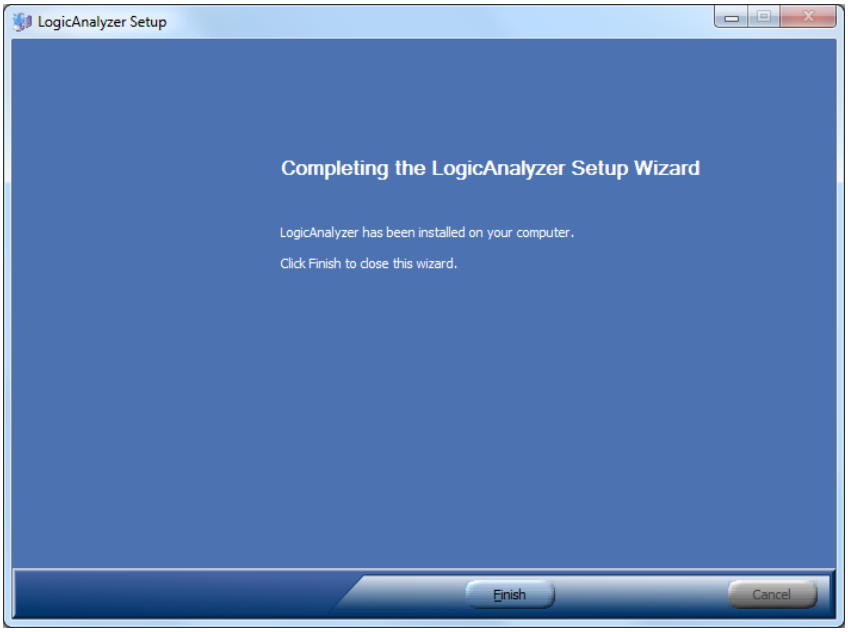

Figure 2-5 Installation completed

The installation of the application is now complete. Proceed to Section 2.2 to complete the driver installation.

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2.1.2 Mac OS X:

To install EasyLogic on Mac OS, the following steps should be followed. The example below is for Mac OS X Mountain Lion but the procedure should be very similar for other Mac OS versions.

Note: The USB driver for Mac OS is embedded within the software. As a result, no separate installation for the driver is needed.

By default, MAC OS may not allow unsigned third-party applications to be installed. In order to overcome this restriction, the security settings need to be changed.

Click on the Apple icon in the top left corner of the screen and choose System Preferences.

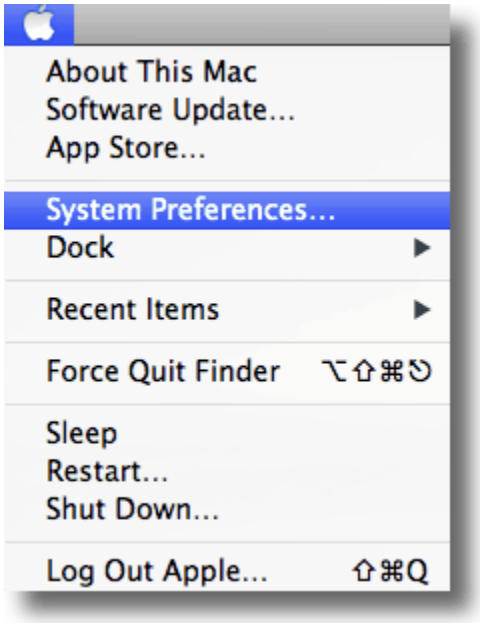

Figure 2-6 System Preferences

Next, click on the Security & Privacy icon.

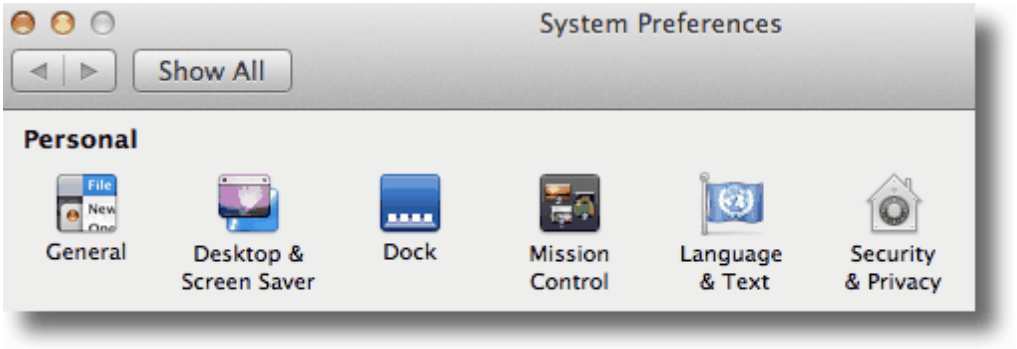

Figure 2-7 Click Security & Privacy

To edit the security settings, click the padlock icon in the bottom left of the window.

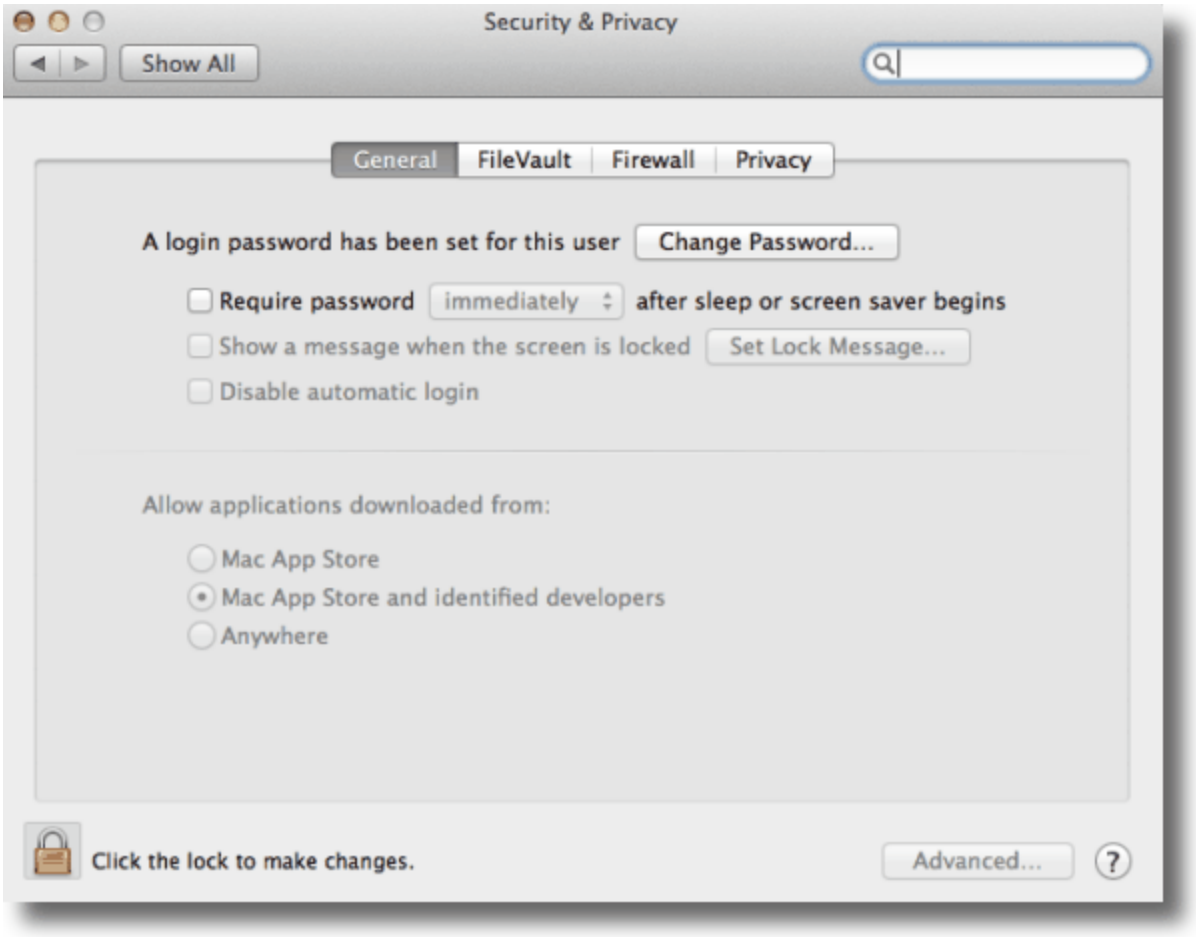

Figure 2-8 Security & Privacy

The Mac credentials will need to be confirmed before the settings can be changed. Enter the password and then hit Unlock.

System Preferences is trying to unlock Security & Privacy preferences. Type your password to allow this.
Name:
Password:
Cancel
Unlock

Figure 2-9 Input Name and Password

On the following screen, under the options for "Allow applications downloaded from", click on the Anywhere" radio button. Upon clicking, a confirmation window will be displayed, click on "Allow From Anywhere".

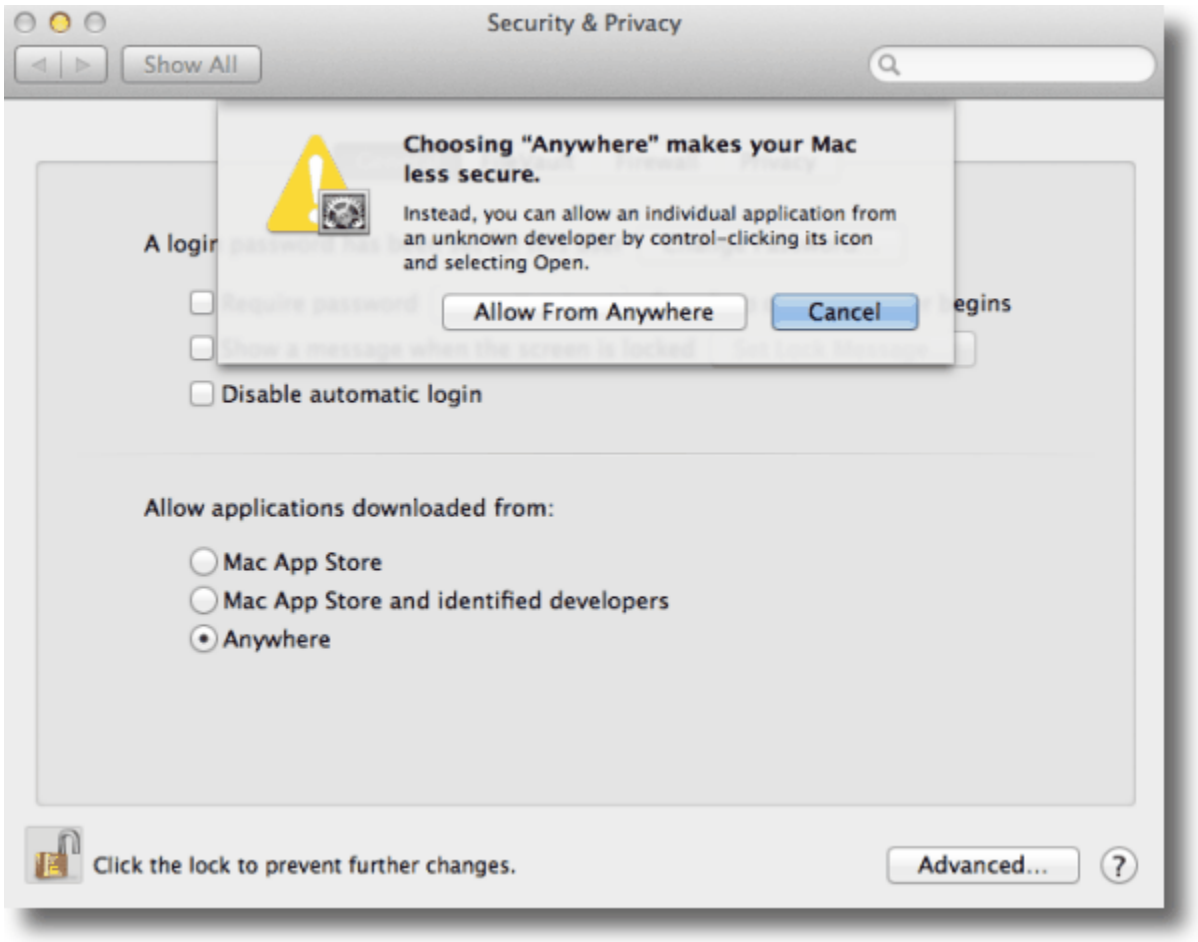
Security & Privacy
Show All
Choosing "Anywhere" makes your Mac less secure.
Instead, you can allow an individual application from an unknown developer by control-clicking its icon and selecting Open.
Allow From Anywhere
Cancel
Disable automatic login
Allow applications downloaded from:
Mac App Store
Mac App Store and identified developers
Anywhere
Click the lock to prevent further changes.
Advanced...

Figure 2-10 Allow 3rd party application

Now that the security settings have been changed, EasyLogic can be installed on the Mac by downloading the royalty-free installer EasyLogic.dmg from the EasySYNC website:

http://www.easysync-ltd.com/page/13/software.html

Figure 2-11 EasyLogic.dmg

After the download is completed, double click on the file to unpack it.

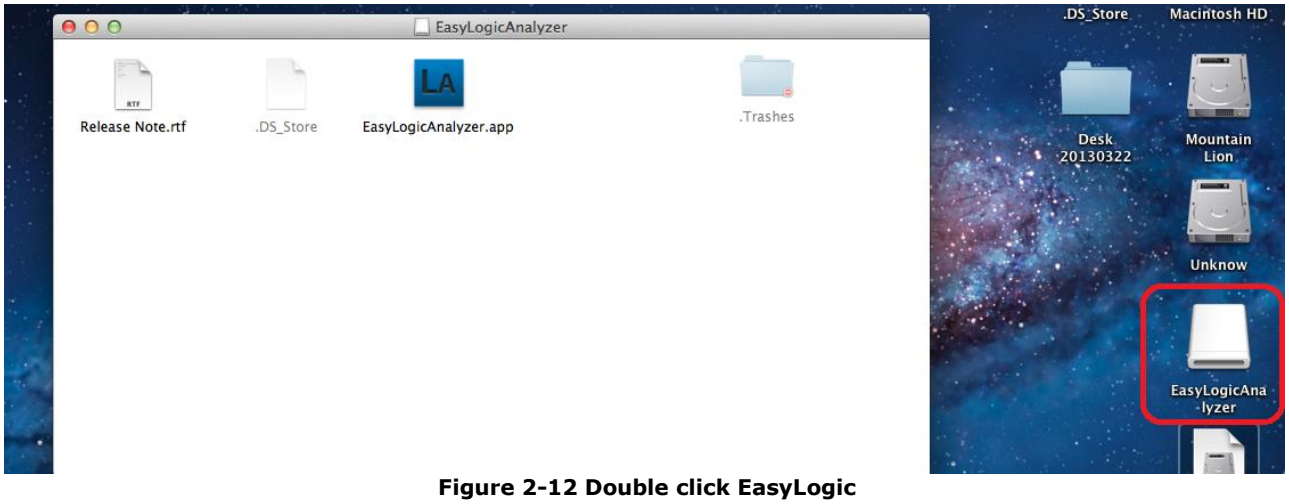

Figure 2-12 Double click EasyLogic

The EasyLogic will then be mounted and the application folder will open.

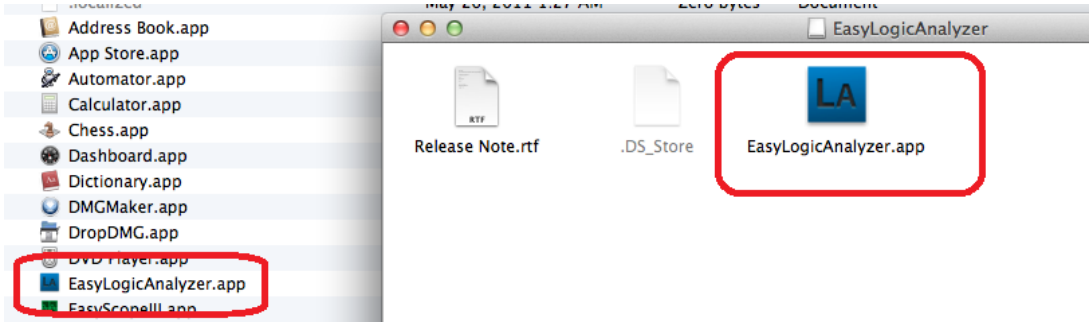

Figure 2-13 Drag the EasyLogic to the Application of Finder

Copy the EasyLogic.app to the Applications folder to complete the installation.

The application installation is now complete. Proceed to Section 2.2 which shows connection of the hardware to the Mac.

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2.2 Device Driver Installation

Before using the analyzer, the USB driver needs to be installed. The Mac and Windows sections below give details for each operating system.

2.2.1 Mac OS X

The installation of the application in the previous section includes the driver for OS X. Therefore, the only step for installation on the Mac is to connect the USB cable from the analyzer to a spare USB port on the Mac.

The analyzer should be plugged into a USB host port on the Mac itself. If a hub is required, a self-powered USB hub (one that has its own power supply) should be used.

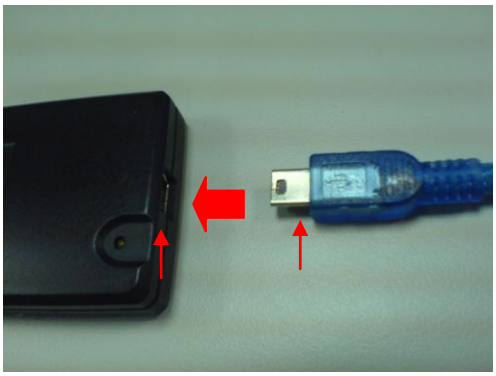

Figure 2-14: Connect the USB cable to the Logic Analyzer

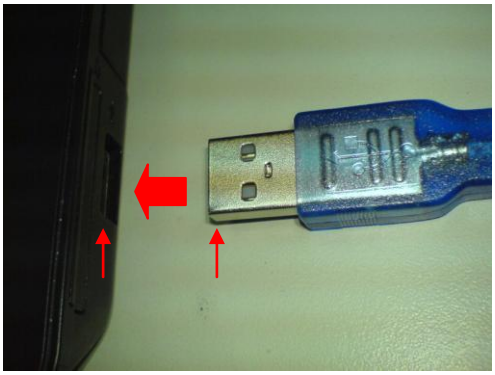

Figure 2-15: Connect the USB cable to the computer

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2.2.2 Windows

To install the driver, connect the analyzer to a spare USB port on the PC. The instrument should be plugged into a USB host port on the PC itself. If a hub is required, a self-powered USB hub (one that has its own power supply) should be used.

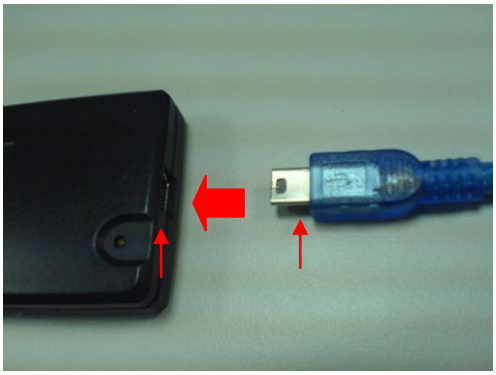

Figure 2-16: Connect the USB cable to the Logic Analyzer

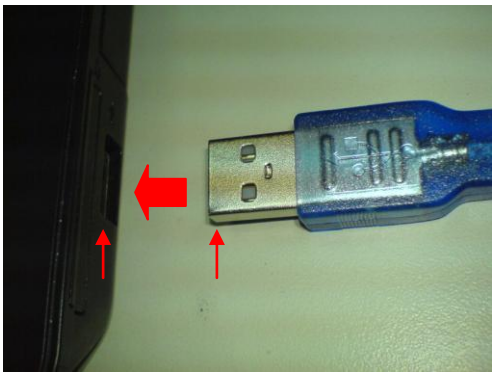

Figure 2-17: Connect the USB cable to the computer

If this is the first time that the instrument has been plugged in, Windows will request the USB drivers for the product and will display a Found New Hardware Wizard dialog box.

The automatic or manual installation method can be used as detailed below.

- Some versions of Windows (normally Vista and onwards) are configured to check automatically for drivers on-line and will complete an automatic installation.
- Older versions of Windows may not do this and the manual method can be used.

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2.2.2.1 Windows - Automatic Installation

The example below is for Windows 7, and it will install the driver automatically provided the PC is connected to the internet.

1. Connect the analyzer to a spare USB port on the PC or self-powered hub. The following screen will appear as Windows searches and installs the driver automatically.

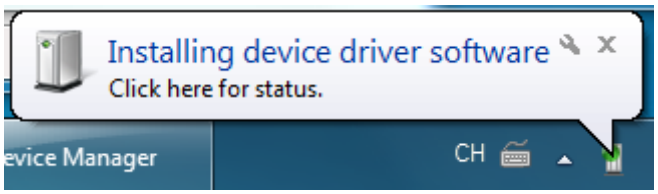

Figure 2-18 Found new device

2. When the driver is successfully installed, the following pop-up will appear.

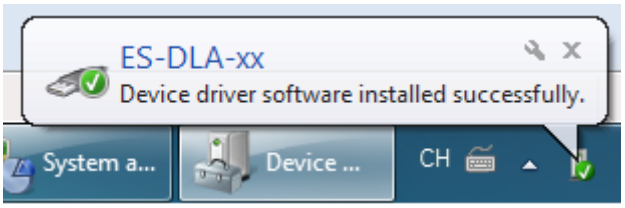

Figure 2-19 Driver installed

2.2.2.2 Windows - Manual Installation

For Windows XP (or later versions of Windows where they are configured not to search online for drivers automatically), the driver installation can be completed using the files provided on the EasySYNC website.

First of all, download the driver from the link below:

http://www.easysync-ltd.com/page/8/certified-drivers.html

Then un-zip the driver to a folder on your PC.

Connect the analyzer to the PC.

When the hardware wizard appears, select "Install from a list or specific location (Advanced)"

Found New Hardware Wizard
This wizard helps you install software for:
ES-DLA-16
If your hardware came with an installation CD or floppy disk, insert it now.
What do you want the wizard to do?
Install the software automatically (Recommended)
Install from a list or specific location (Advanced)
Click Next to continue.
< Back
Next >
Cancel

Figure 2-20 Install driver

2. Browse to the folder where the un-zipped driver has been saved.

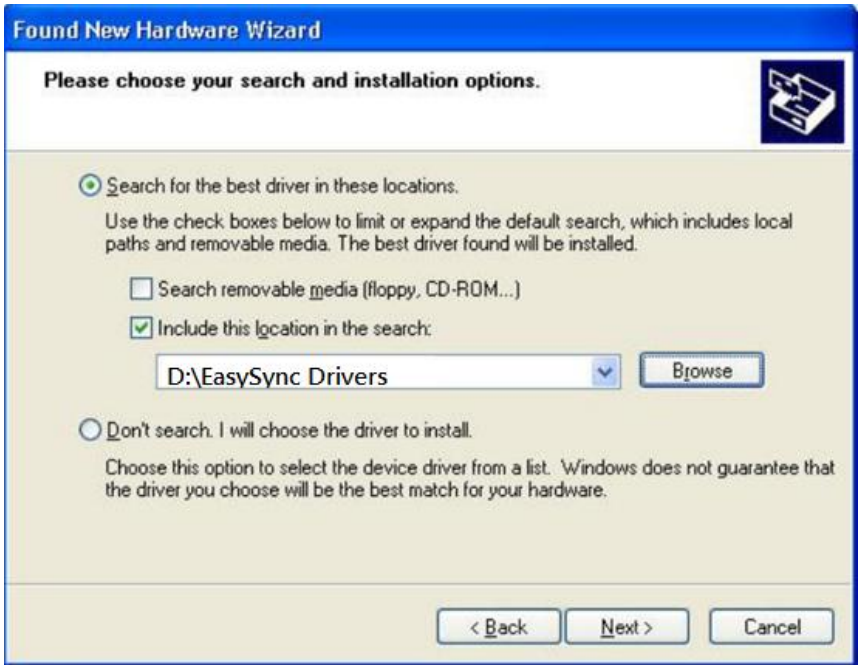
Found New Hardware Wizard
Please choose your search and installation options.
Search for the best driver in these locations.
Use the check boxes below to limit or expand the default search, which includes local paths and removable media. The best driver found will be installed.
Search removable media (floppy, CD-ROM...)
Include this location in the search:
D:\EasySync Drivers
Browse
Don't search. I will choose the driver to install.
Choose this option to select the device driver from a list. Windows does not guarantee that the driver you choose will be the best match for your hardware.
< Back
Next >
Cancel

Figure 2-21 Find driver location

3. The device is now ready to use.

Figure 2-22 Driver installed

2.3 Hardware Setup

After the application and driver installation, the next step is to connect the analyzer's logic probes.

Note: If the analyzer is not currently connected to the computer, it should be connected now.

First, connect the supplied wire harness to the device. For the 8-channel analyzer, there will be one wire harness with 10 clips. For the 16-channel analyzer, there will be two harnesses, each with 10 clips, giving 20 clips in total.

Note that there is no need to connect both harnesses in the 16-channel device if only 8 channels are currently required.

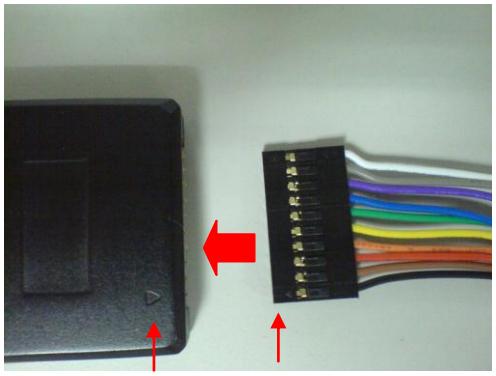

Figure 2-23: Plugging the wire harness into the analyzer

Note: The black wire (ground) must be aligned to the triangle symbol marked on the analyzer body, as shown above.

After the wire harness is connected, the test clips can be connected to the device under test (DUT).

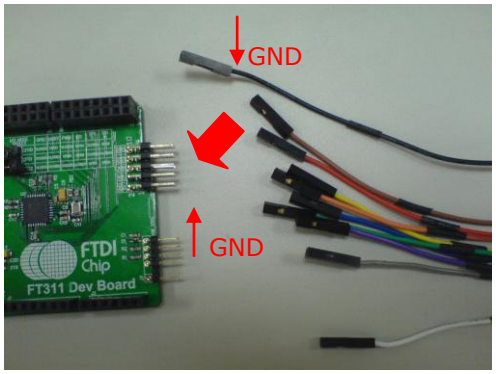

Figure 2-24: Connecting test clips to DUT

2.4 Installation Complete

The set-up is now complete and the analyzer is ready for use. The remainder of this manual explains the features of the EasyLogic software.

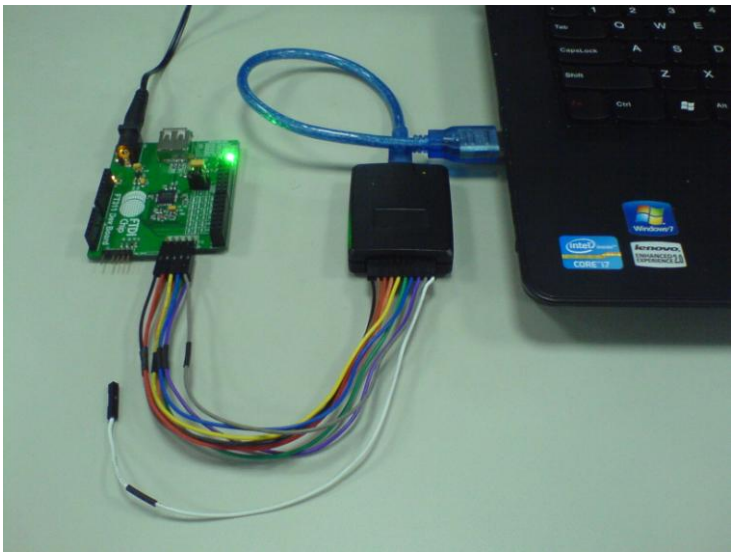

Figure 2-25: An Assembly of Laptop, Logic Analyzer, and DUT

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3 Using the ES-DLA-8/16

This section provides a brief introduction to using the ES-DLA-8/16 logic analyzer. A full description of each option in the user interface is given in Section 4 (User Interface).

3.1 Connect to the ES-DLA-8/16 Device

This section assumes that the analyzer has been installed as shown in section 2 of this guide.

The first step is to open the EasyLogic software. Note that if the application is opened before the ES-DLA-8/16 is connected to the USB port of the computer; the Scan function may need to be run to allow the application to detect the analyzer (see Figure 3-1 below).

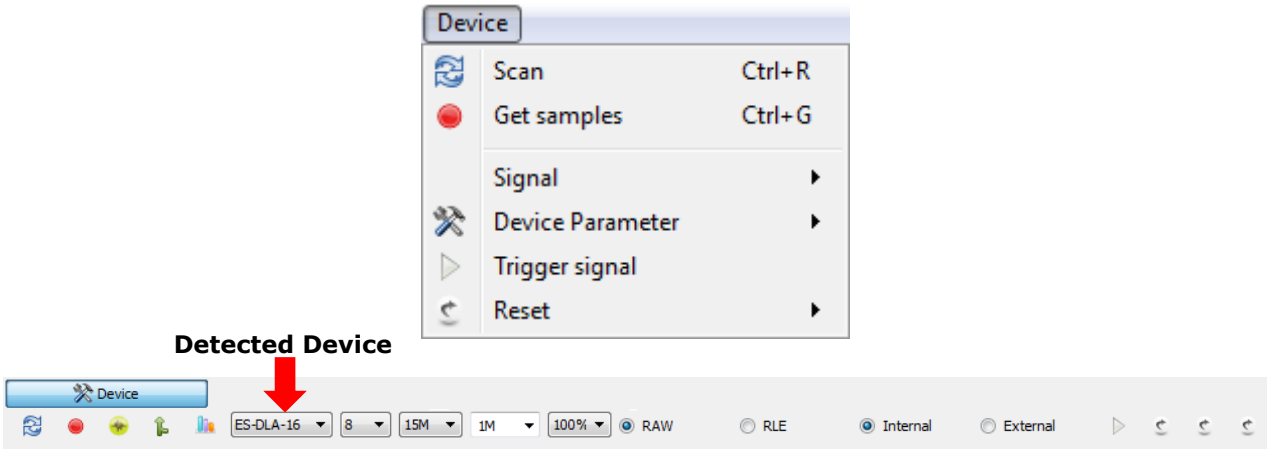

Figure 3-1 Scan Device

When the device is successfully detected by the application, it is shown in the Detected Device drop-down box. It is now ready for use.

3.2 Log Data

This initial example assumes that the capture is being started manually and that no triggering is used.

The sample rate and number of samples can also be configured at this point to suit the waveform being monitored. For example, set the sample rate to 250K and the number of samples to 1M.

Logging can then be started in one of two ways (see Figure 3-1 above):

- Clicking the 'Device' menu and selecting Get Samples, or
- Clicking the red dot button on the menu bar

Once the capture is started, the device will begin to record data.

The dialog below is displayed during recording, and disappears after recording is complete. If the settings mentioned earlier in this section were used, the capture will take place over a period of 4 seconds (1M samples at 250K samples/sec). The cancel button can also be used to stop the capture manually.

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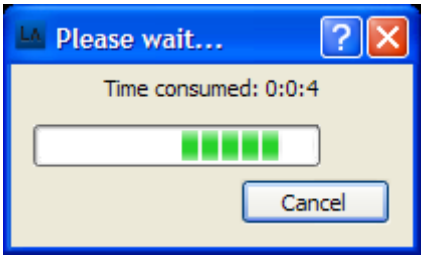

Figure 3-2 Capture in progress

Once the capture cycle has competed, the waveform will be displayed. One example of captured data is shown below.

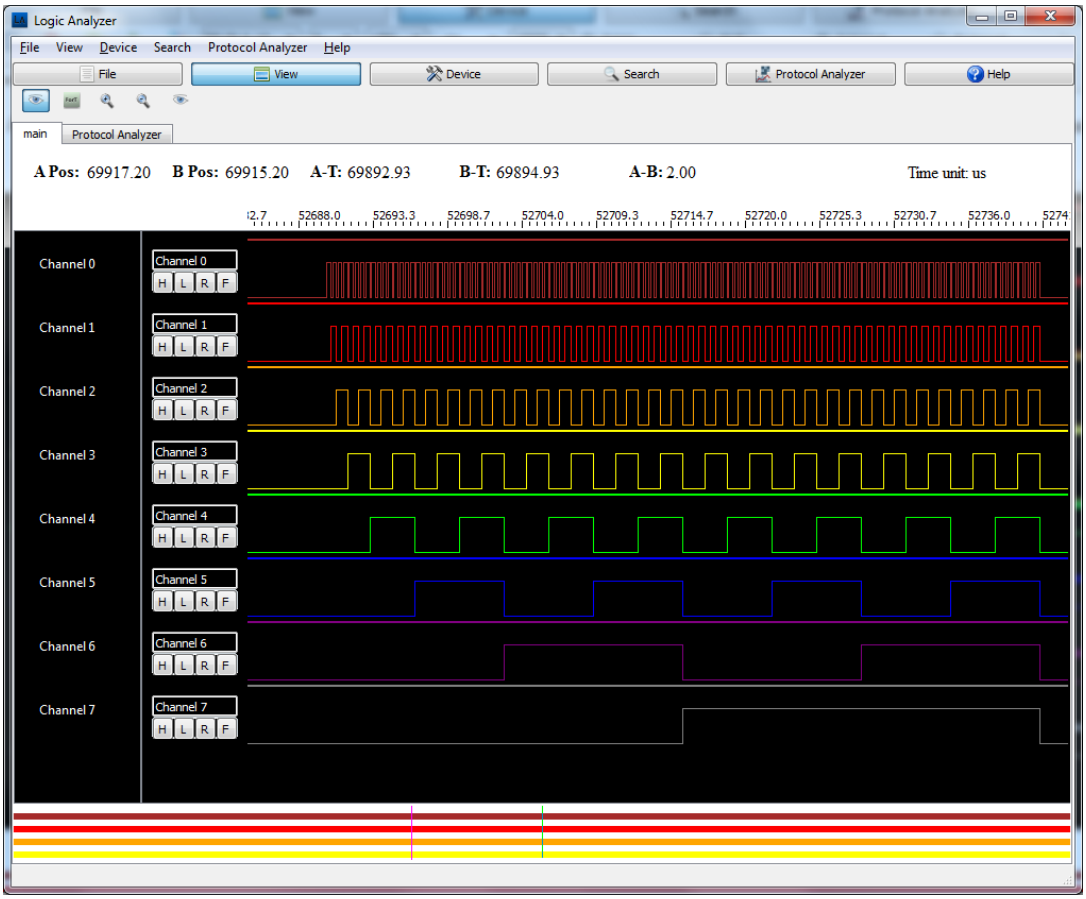

Figure 3-3 Collect Logic Data

Note: There are additional options available from the Device menu and menu bar shown in Figure 3-1. Further details of these options and device setup can be found in Section 4.6.3 (Device Menu and Related Buttons).

3.3 Set Trigger Conditions

The data of interest may not always be present immediately after the capture is started. Therefore, trigger conditions can be set so that the analyzer can begin capturing data once a specific condition occurs.

The trigger conditions are defined by left-clicking the “H”, “L”, “R”, and “F” buttons to select the interested signal pattern.

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The trigger position can also be set from the Quick Access bar (as described in Section 3.1 above). This allows the position of the trigger within the captured data to be specified.

- In some cases, the trigger condition marks the end of the desired data, i.e. the analyzer stops when the trigger condition is detected, and then displays the selected number of samples before the trigger occurs. In this case, 100% would be selected.
- In other cases, the data after the trigger occurs may be of interest. In this case, the trigger position would be set to 0% and the analyzer will collect the selected number of samples after the trigger occurs.
- Other trigger positions (25%, 50%, and 75%) allow some data to be collected before and some collected after the trigger occurs.

Once the trigger condition has been selected, the "Get samples" menu option or the red button on the Quick Access toolbar should be clicked to arm the analyzer. The analyzer will now begin capturing data according to the sample rate and number of samples settings specified in the Quick Access toolbar (as described in Section 3.1 above)

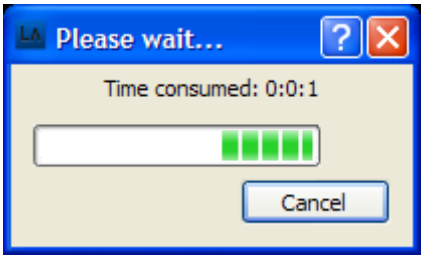

Figure 3-4 Capture in progress

The capture will stop automatically once the trigger has occurred (and once any data occurring after the trigger has been collected if the trigger position dictates this).

Note: These buttons provide the following options

H	Trigger on High
L	Trigger on Low
R	Trigger on Rising Edge
F	Trigger on Falling Edge

Only one of the four buttons may be enabled at a time. To disable all four buttons, click again on the selected one.

Channel and Trigger Setting

Figure 3-5 Set Trigger Condition

3.4 Finding Data or Signal Patterns

After capturing data, the search function can be used to easily locate a data pattern of interest. There are several search features available through the Search menu, and full details can be found in section 4.6.4 (Search Menu and Related Buttons).

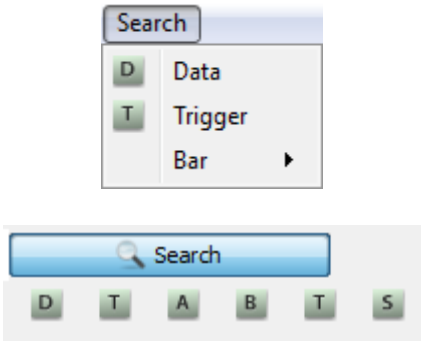

Figure 3-6 Search Data or Signal Pattern

3.5 Analyze and Decode Result

The software also includes decoders for common serial protocols (I2C, One Wire, UART and SPI). These can be enabled after a data capture run has completed, in order to analyze and decode the captured data. This feature can be accessed through the Logic Analyzer tab on the menu bar.

Full details of the options available are given in section 4.5 (Protocol Analyzer).

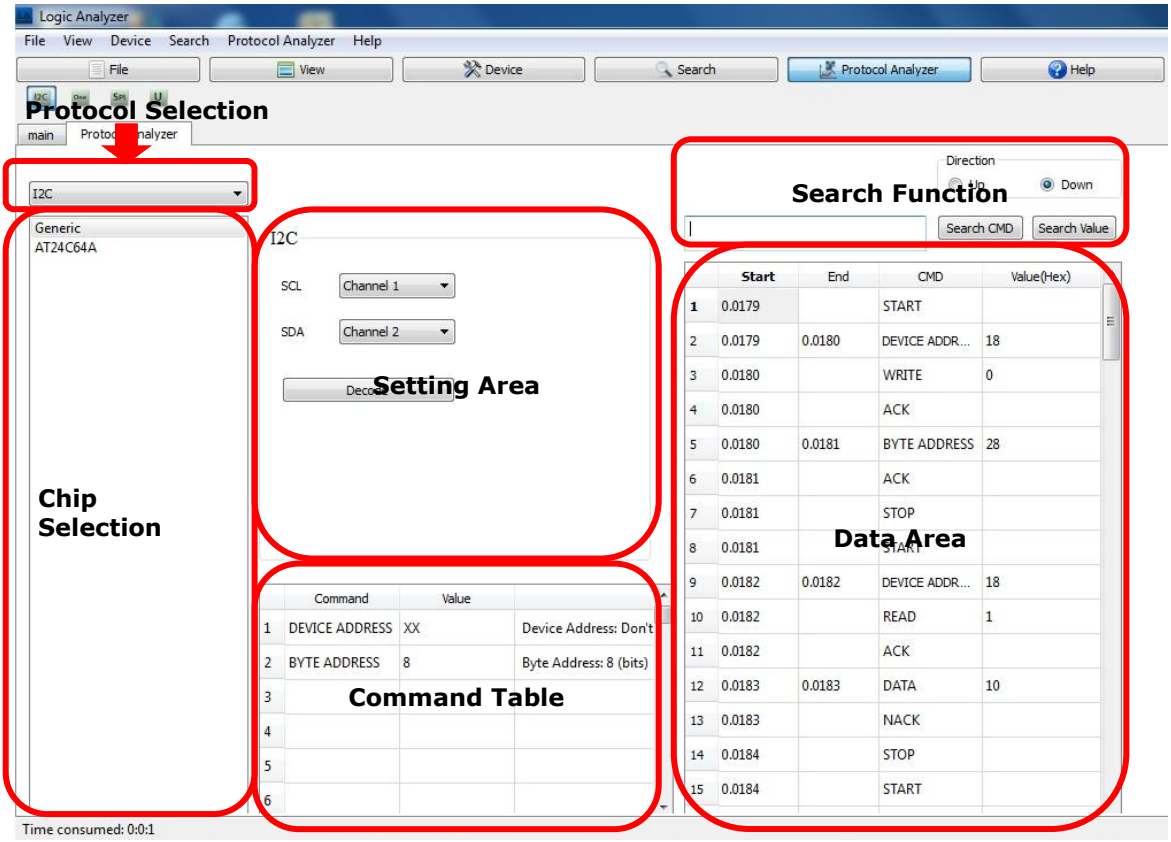

Figure 3-7 Protocol Analyzer

4 User Interface

This section describes the user interface of the EasyLogic software.

The application window has seven main areas, which are highlighted below. This chapter illustrates how to use the various options and settings within the user interface.

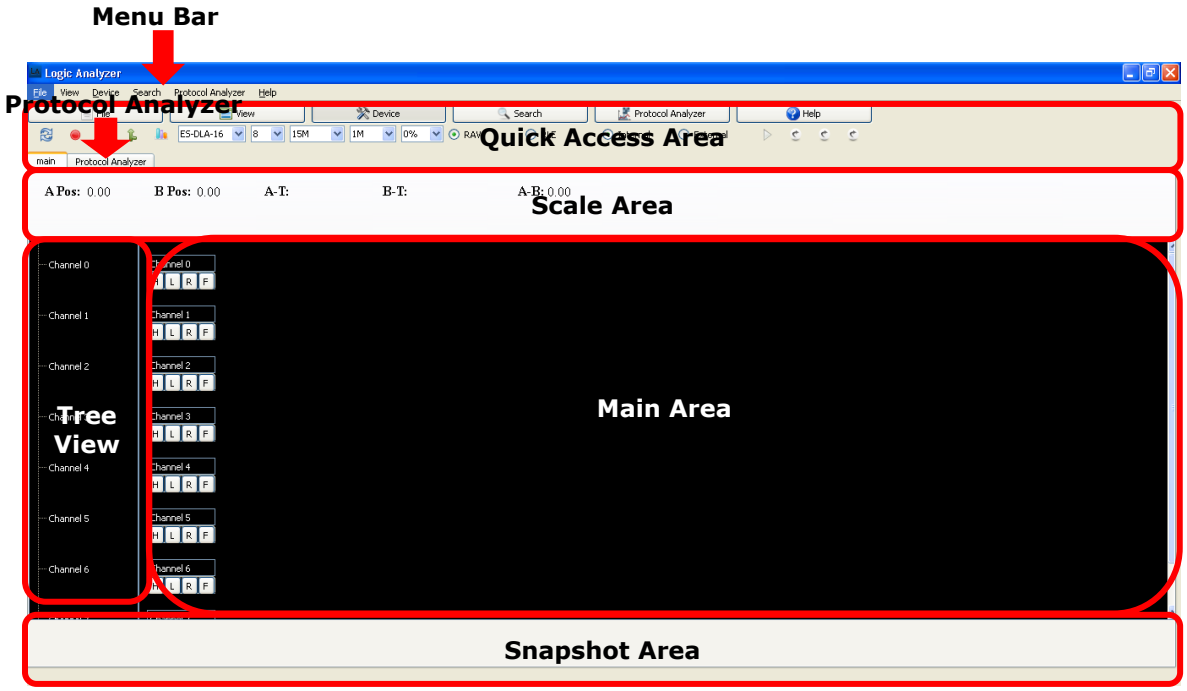

Figure 4-1 Screenshot of Main UI

4.1 Main Area

This area is used to display the waveform data, with a separate trace for each channel. This view supports 4, 8 or 16 channel waveforms. Once the captured data is displayed, it is possible to scroll along the collected waveforms and re-size the view.

There is a channel setting area to the left-hand side of the waveform displays. This area contains the controls for setting the channel name, data display colour, or triggering conditions.

Figure 4-2 Main Area

4.1.1 Set Trigger Conditions

These buttons allow the trigger condition to be set.

Figure 4-3 Channel name and Trigger Buttons

The buttons correspond to the following modes:

H : Trigger on High Level
L : Trigger on Low Level
R : Trigger on Rising Edge
F : Trigger on Falling Edge

Note: Only one button will be selected at a time. The button selected will show as pressed in (darker grey). If a button is currently selected, it can also be de-selected by clicking on it again.

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4.1.2 Configure Channel Name and Data Display Color

To configure the channel name and waveform colour, right-click on the name of channel (e.g. the "Channel 0" part of Figure 4.3) and a pop-up menu will appear:

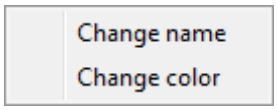

Figure 4-4 Channel Pop-up Menu

By selecting "Change name" from this menu, a change name dialogue will appear and a new name can be entered.

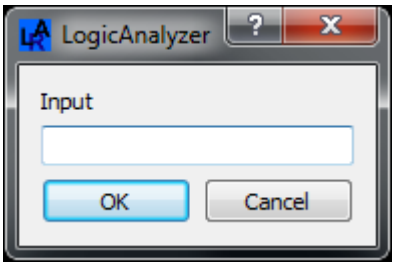

Figure 4-5 Change Channel Name Dialog

By selecting "Change Colour", the color chooser dialog will appear to allow the colour for that channel to be selected.

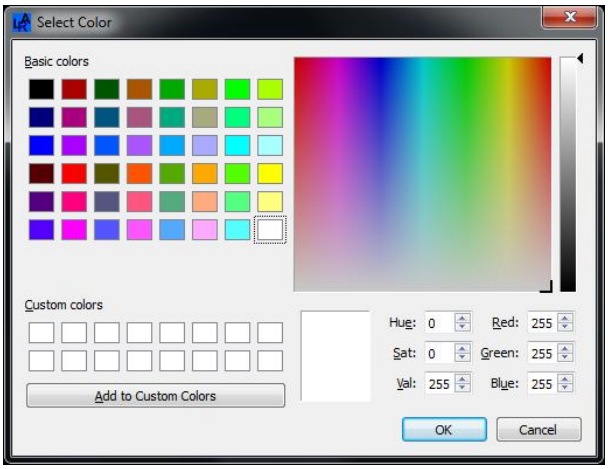

Figure 4-6 Channel Color Chooser

4.1.3 Use Mouse Scroll Wheel to Resize

If the mouse has a scroll wheel, this can be used to zoom in and out of the waveforms shown in the display. This allows for zooming in and out of the waveform quickly, for example zooming out to help find the area of interest and then zooming in to examine the waveform in more detail.

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4.2 Tree View

The tree view allows more than one channel to be combined into a single bus. Initially, each channel is shown separately with its own name adjacent to each trace. However, where the signals being recorded are part of a bus, it is helpful to combine them within the analyzer software to display them as a bus.

Figure 4-7 Tree view

4.2.1 Combine Channels to Form a Bus

To combine several signals into a single bus, the following steps can be used:

1. Select the required channels by left-clicking on each channel name in turn in the tree view area.

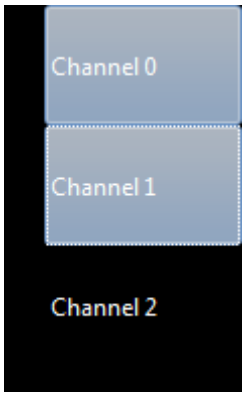

Figure 4-8 Select Channels to Form a Bus

2. Right-click on one of the selected channels to display a pop-up menu for bus management, as Figure 4-9 shows. Then left-click on the "Combine to bus" menu item to create a bus.

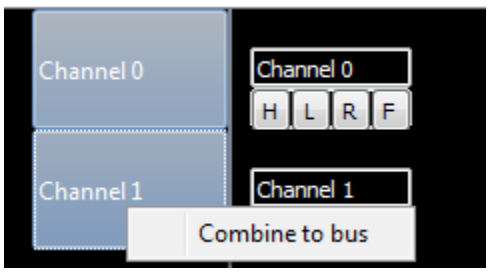

Figure 4-9 Combine Channels to Form a Bus

As shown in Figure 4-10, Channel 0 and 1 are now combined into a new bus called "Bus 1". The '-' button next to the bus name can be used to collapse the bus into a single row. Likewise, the '+' button can be used to expand the bus again to show the individual channels within.

Figure 4-10 Expanded Tree View

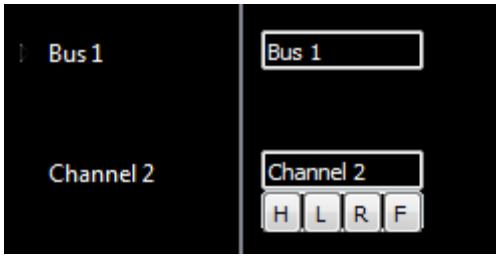

Figure 4-11 Collapsed Bus View

4.2.2 Delete a Bus or All Buses

To remove the grouping of the signals on the tree view, the following steps can be used.

1. Right-click on the bus to be removed to display the pop-up menu, as shown in Figure 4-12.

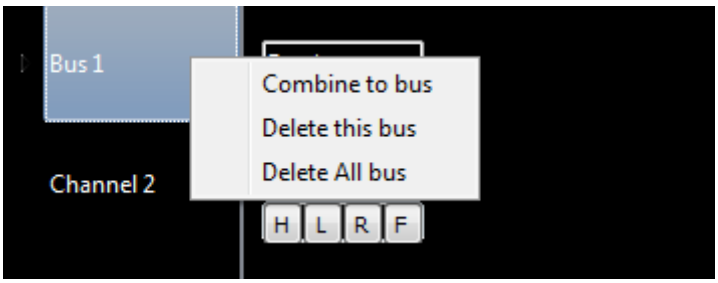

Figure 4-12 Bus Pop-up Menu

2. Click "Delete this bus" to un-group only this bus, or alternatively, click "Delete All bus" to un-group all of the buses which have been created.

Note that when one or more buses exist, it is also possible to un-group all of the existing buses by right-clicking on a single channel (which is not part of a bus) and selecting "Delete All bus" from the pop-up menu.

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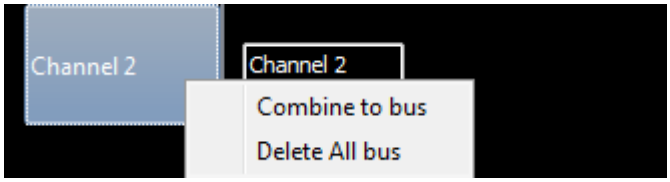

Figure 4-13 Channel Pop-up Menu

4.3 Scale Area

This area sits in-between the **Quick Access** and **Main** areas. It is used to display time-based information about the collected data, the cursor (time marker) positions, and the timing interval between cursors.

In Figure 4-14 for example, the information shown in the **Scale** area includes the timescale for the collected electronic signal, the marker position for cursor A, B, T, and S, and timing interval between A, B, and T.

Note: The cursor S marks the data which a user has searched for. The cursor T shows the trigger point, where the data had matched the trigger conditions specified. Cursors A and B are user-defined markers which can be used for reference (e.g. to measure the time between two user defined points).

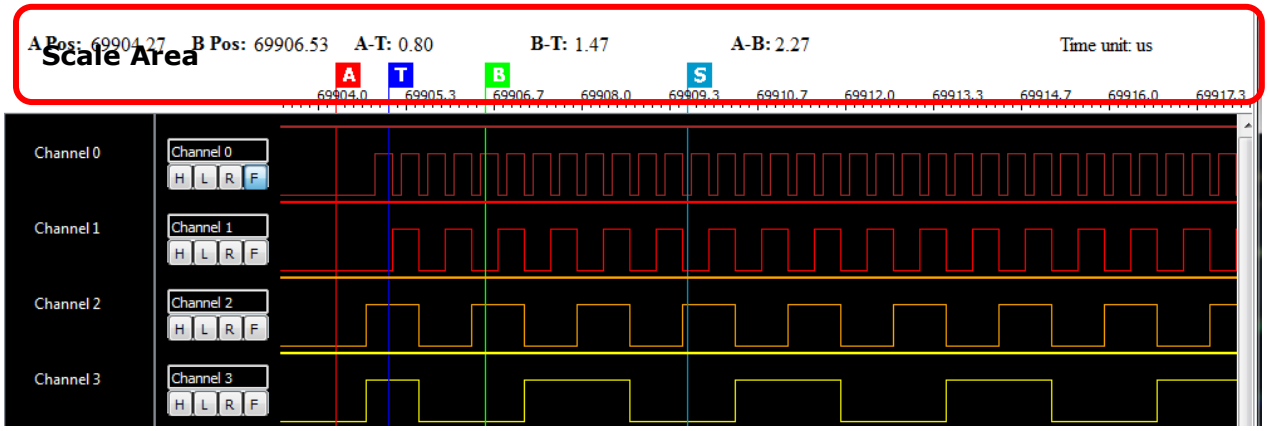

Figure 4-14 Scale Area and Waveform

To enable cursor A and cursor B, right-click on the waveform to display the pop-up menu, and then left-click "Move A to here" or "Move B to here" to define the A/B marker position.

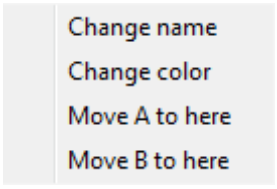

Figure 4-15 Waveform Pop-up Menu

4.4 Snapshot Area

The Snapshot area is used to show the relative position of the current waveform displayed on **Main** area to the entire set of collected data.

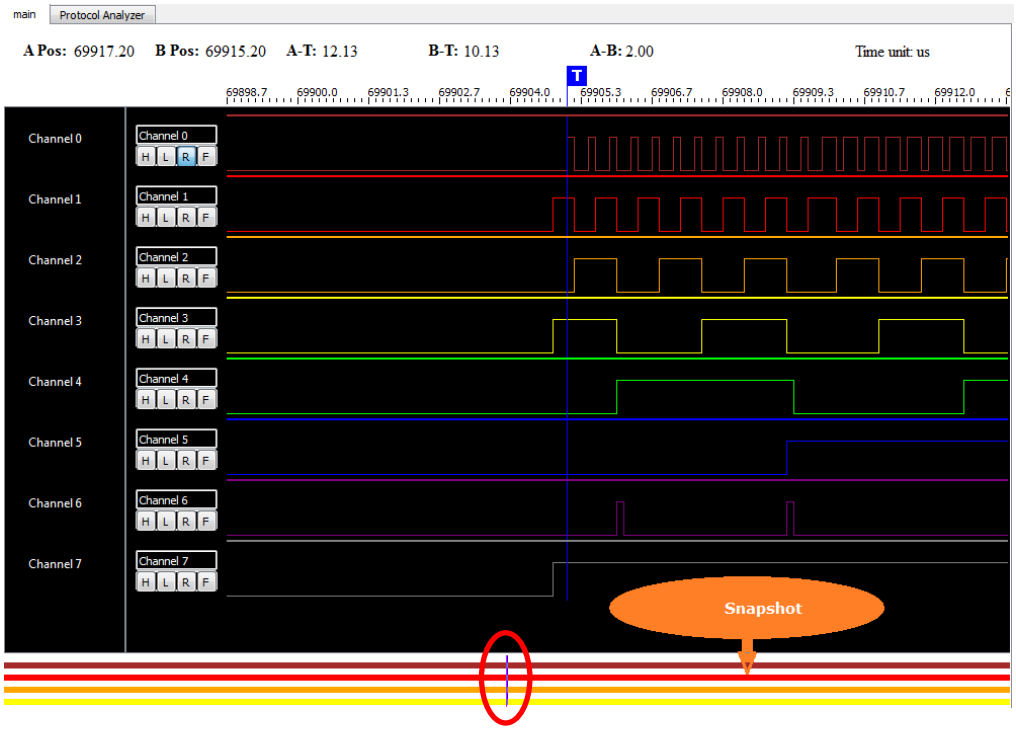

Figure 4-16 Snapshot area

There are two main ways to scroll along the captured data:

- Click the left mouse button on the desired position within the snapshot area. The main display will then scroll immediately to this point to show the waveforms at this position. For example, clicking half-way along the snapshot bar at the point circled in red above will cause the main display to show the point half-way through the entire set of captured data. This method is useful to move the position close to the main area of interest within the waveform.

- Position the mouse pointer within the area of the snapshot area and use the mouse scroll wheel to scroll the position forward or backward. The vertical line on the on the snapshot area shows the current position which is being displayed in the main waveform window. This method is useful to fine-tune the position of the main waveform window to find the exact part of the captured data which is required.

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4.5 Protocol Analyzer

The EasyLogic software can decode and analyse UART, I2C, SPI and One-Wire protocols through the Protocol Analyzer tab.

Switching between the Main and Protocol Analyzer displays can be achieved by clicking on the appropriate tab. These tables can be found underneath the Quick Access area.

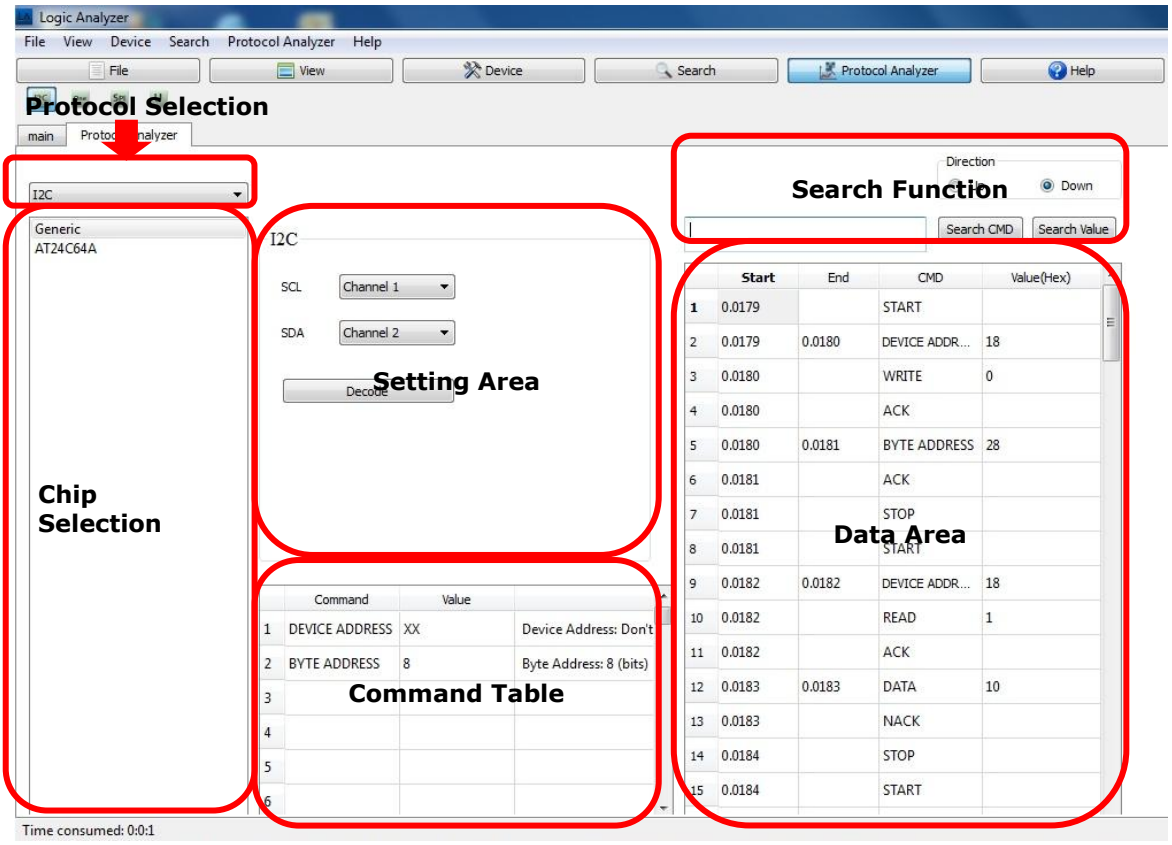

Figure 4-17 Protocol Analyzer

The user interface of the analyzer contains six main panels:

Protocol Selection

This is used to select the protocol which the software will decode within the data stream. It should be set to match the actual protocol used in the data which has been captured. The software can decode the "UART", "I2C", "ONEWIRE" and "SPI" protocols.

Chip Selection

Pre-defined decoders are available for some chip types. In these cases, the commands for that device will be displayed in the command table. For example, if an SPI communication to an AT93C46 EEPROM has been recorded, then setting the protocol to SPI and selecting AT93C46 from the chip selection panel will show the commands for that particular chip.

If the chip type is not listed, the 'Generic' option should be selected in this panel.

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Setting Area

These settings can be used to configure the protocol decoder. Note that the controls available depend on which protocol is selected. Drop-down boxes are used to specify which of the logic analyzer channels corresponds to each of the signals (e.g. which channel is SCL in an I2C waveform).

It includes other settings depending on the protocol, such as the Clock Polarity, CS Polarity, Bit Order and Clock Phase for SPI.

Note: The following sections give details of the options for each protocol.

The Decode button is then pressed to start decoding of the data.

Command Table

For a pre-defined chip, this table shows the commands associated with particular values, for example, the Page Program command on an EEPROM chip.

Search Function

This allows searching of the transactions shown in the Data Area below. The desired value can be entered and the Search Value button pressed. The search can be carried out in either direction from the current position by using the Up and Down radio buttons.

Data Area

This area shows the decoded data in list form.

4.5.1 I2C Decoder

For the I2C decoder, the only settings required are to specify which logic analyzer channel is associated with each I2C signal and then click Decode to start the decoding.

Figure 4-18 The Setting of I2C Decoder

4.5.2 One Wire Decoder

The 1-wire protocol decoder only requires the logic analyzer channel used for the IO line to be specified and then click Decode to start the decoding.

Figure 4-19 The Setting for 1-Wire Decoder

4.5.3 SPI Decoder

The SPI decoder requires the logic analyzer channels used for the CS, SCK, MOSI and MISO to be specified. It also requires the polarity of the chip select, the bit order, the clock polarity and the clock phase to be selected.

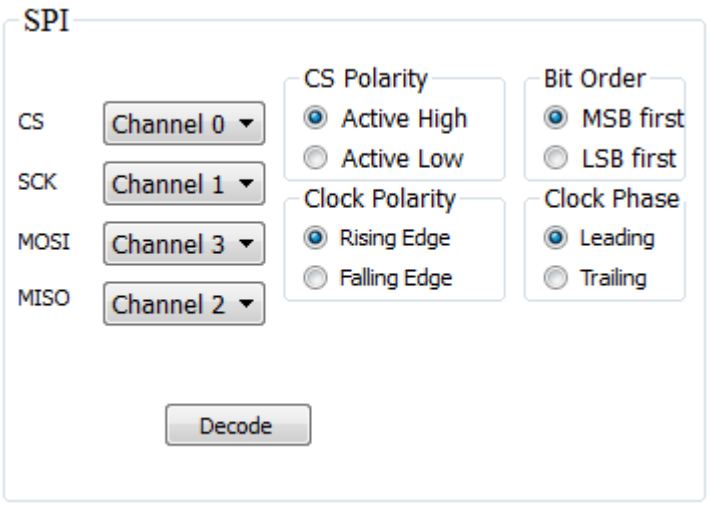
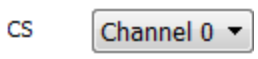


Figure 4-20 The Setting of SPI Decoder

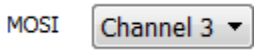
To configure the SPI decoder,

1. Select the CS channel.



2. Select the SCK channel.

3. Select the MOSI channel.

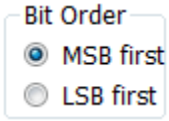


4. Select the MISO channel.

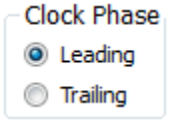
5. Select CS Polarity.

6. Select Clock Polarity.

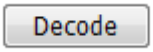
7. Select Bit order.



8. Select Clock Phase.



9. Click "Decode" button to analyze data; the analyzed data will be shown in the data area.



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4.5.4 UART Decoder

In addition to selecting the logic analyzer channels used for the UART, Tx and Rx signals, the baud-rate, data bits, parity, and MSB/LSB setting must also be specified, then click the Decode button to decode the UART data.

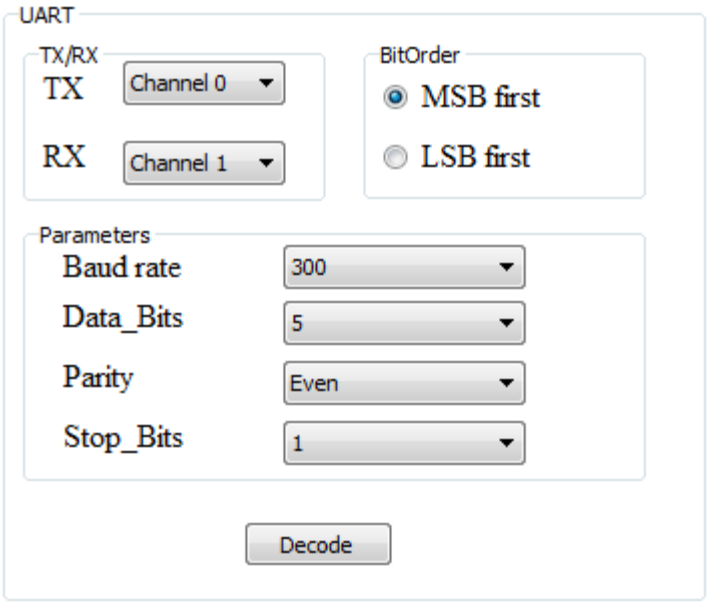

Figure 4-21 The Setting of UART Decoder

4.6 Menu and Quick Access Buttons

The analyzer software has various menus which allow the settings to be changed and to start the capture etc; for convenience, most of these tasks can also be accomplished using the buttons on the Quick Access menu. This section covers the menu options and also the equivalent buttons on the Quick Access menu.

To use the Quick Access menu, click on the required button (for example File) and the toolbar below will now show the buttons used to carry out tasks related to the File menu, such as Save and Export. Hovering over a button will bring up a small tool tip to show its purpose.

Figure 4-22 Menu and Quick Access Buttons

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4.6.1 File Menu and Related Quick Buttons

This menu provides functions related to the files containing captured data.

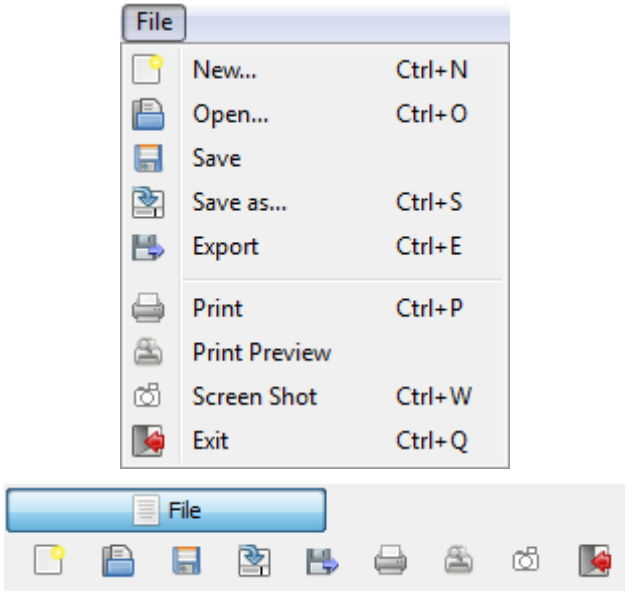

Figure 4-23 File Menu and Buttons

1. **New**

Clears the current set of captured data.

2. **Open**

Opens an existing raw data file.

3. **Save**

Updates the currently opened file.

4. **Save as**

Saves currently used data into another file.

5. **Export**

Exports the data into a .txt or .csv file.

6. **Print**

Prints out the current waveform (screenshot) to a printer.

7. **Print Preview**

Shows a preview of the waveform to be printed in a preview window with "Print" and "Cancel" buttons. Click "Print" to print this screenshot and click "Cancel" to close this window.

8. **Screen Shot**

Saves a screenshot of the waveform to an image file.

9. **Exit**

Exits the program.

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4.6.2 View Menu and Related Buttons

This menu and related buttons provide functions to adjust the channel tree, image zoom, and waveform views.

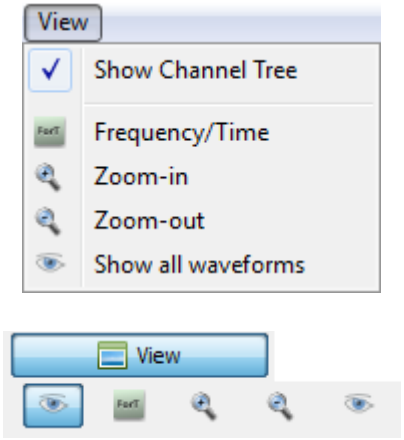

Figure 4-24 View Menu and Buttons

1. **Show Channel Tree**

Shows or hides the channel tree view. See chapter 4.2 for further details.

2. **Frequency/Time**

Switches between Time-based and Frequency–based scales. See chapter 4.3 for further details.

3. **Zoom-in**

Zooms in on the waveforms displayed in main area. See chapter 4.1 for further details.

4. **Zoom-out**

Zooms out on the waveforms displayed in main area. See chapter 4.1 for further details.

5. **Show all waveforms**

Zooms out fully to view the entire waveform.

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4.6.3 Device Menu and Related Buttons

The device menu is used to start the capture process and to configure logic analyzer settings.

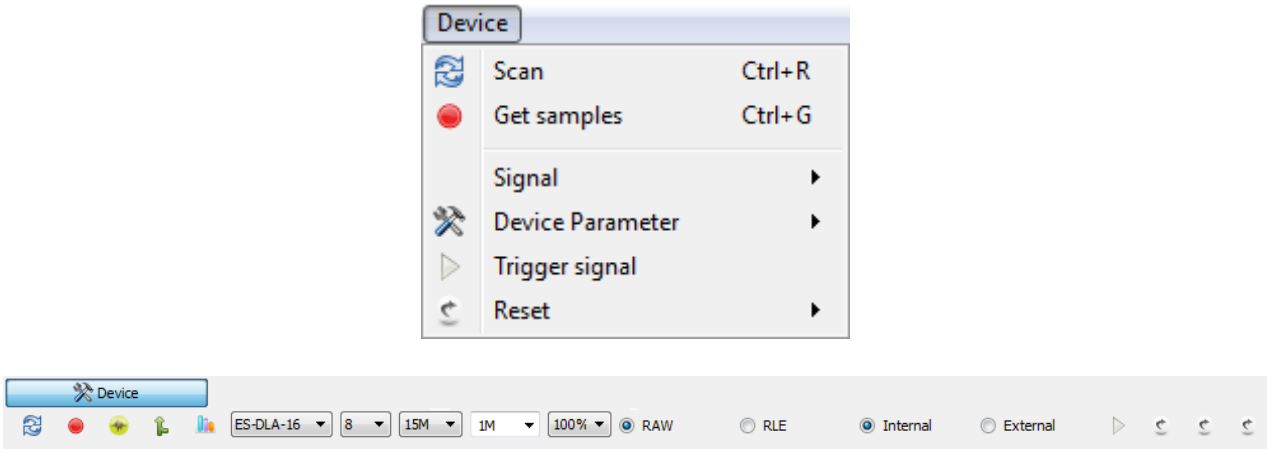

Figure 4-25 Device Menu and Buttons

1. Scan

This scans for the logic analyzer hardware. If the hardware is connected after the EasyLogic software was started, the ES-DLA-8/16 may not be detected by the software. This button can be used to detect the hardware.

2. Get samples

Starts the capture of logic signals. If no trigger is specified, the capture starts immediately. If a trigger is specified, this button arms the analyzer to wait for the trigger condition.

3. Signal

This item includes the following sub-menu:

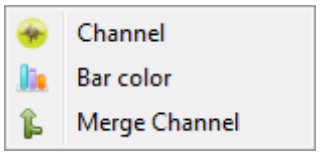

Figure 4-26 Signal Sub-Menu

3.1 Channel

This menu item opens a channel name and color editor. In here, the name and colour can be configured for all channels. As mentioned in section 4.1.2 (Configure Channel Name and Data Display Color), each channel can be edited individually, but this option allows all of the channels to be configured at the same time.

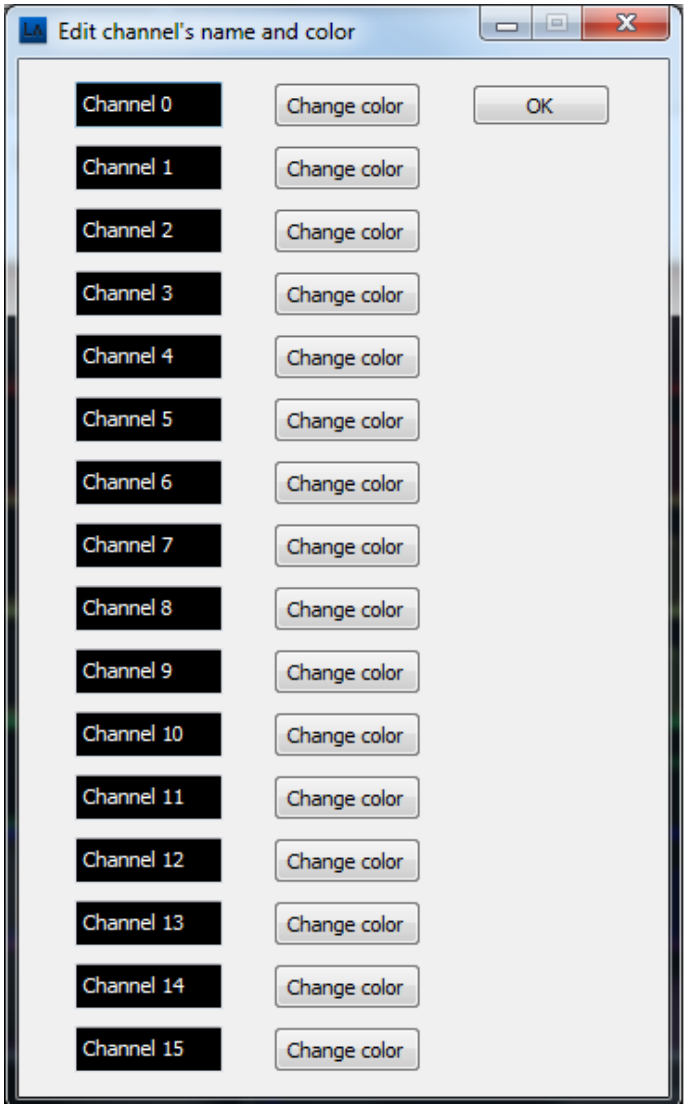

Figure 4-27 Channel Name and Color Setting Editor

3.2 Cursor color

This menu item opens a cursor (marker) editor, where the colours of the A, B, and T cursors can be selected.

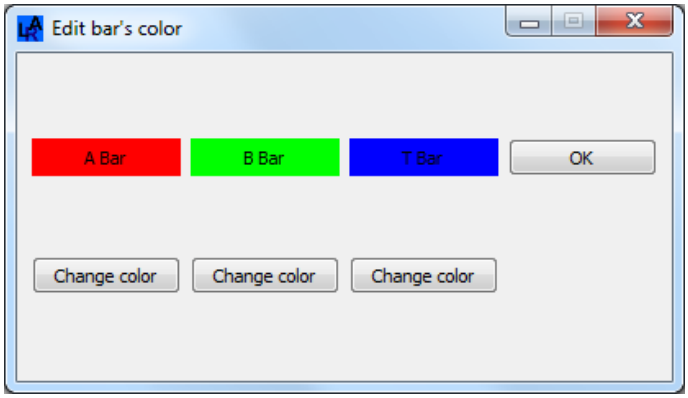

Figure 4-28 Cursor Color Editor

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3.3 Merge Channel

This menu item opens the bus management editor for the waveform display. This provides similar functionality to the tree view in section 4.2, where channels can be merged into buses or buses can be un-merged, but allows all of the channels to be edited from a single menu.

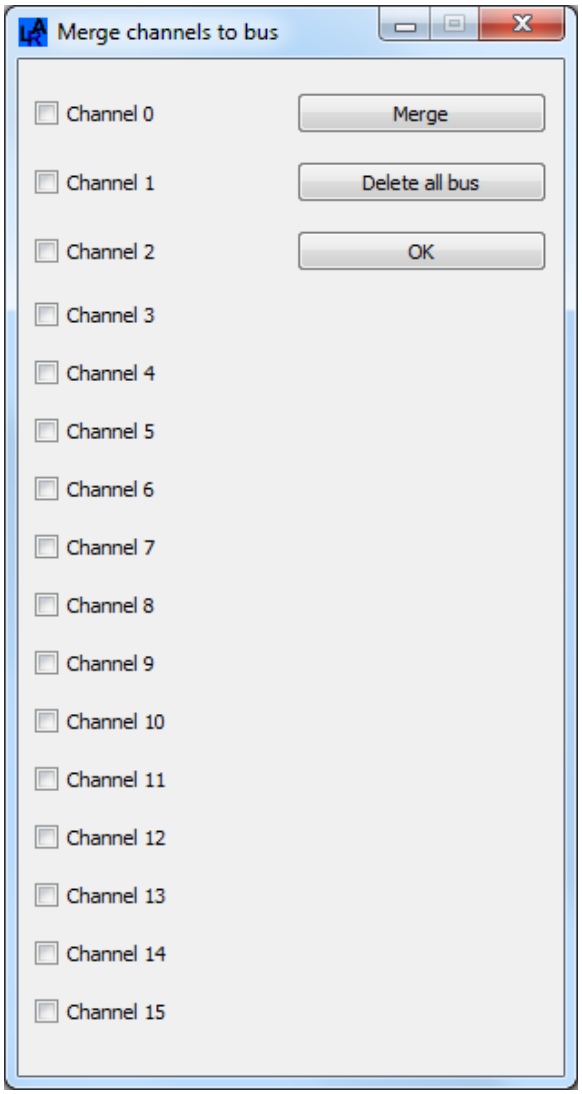

Figure 4-29 Bus Management Editor

4. Device Parameter

This menu item contains several options to configure the ES-DLA-8/16.

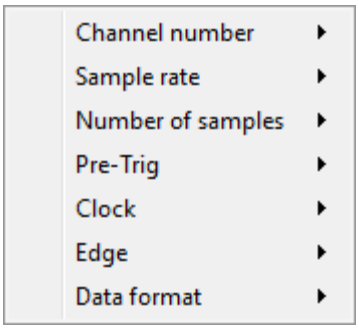

Figure 4-30 Device Configuration Sub-menu

4.1 Channel number

This selects how many channels are actually used. Selections of 4, 8 and 16 channels are possible. This setting affects the maximum useable sample rate available. Higher sample rates are available with smaller numbers of channels.

4.2 Sample rate

This allows the sample rate to be configured. Rates between 25K and 30MHz are possible, but the actual range available also depends on the number of channels used.

4.3 Number of samples

This defines how many data samples are collected. Sizes between 1MBytes and 1GBytes are possible.

If no trigger has been set, the capture will begin immediately and will run until the specified number of samples has been collected. If a trigger condition has been set such that data is to be captured after the trigger point, the capture will continue until all of the required data has been captured.

4.4 Pre-Trig

This defines how much data is collected before a trigger condition is met, and therefore whether the trigger point lies at the beginning or the end of the captured data. It can also be set to 25%, 50% or 75% to capture some data before and some data after the trigger.

Settings of 0%, 25%, 50%, 75% and 100% are available.

4.5 Clock

This selects which clock source should be used for the sample rate calculation and data acquisition. Internal or External can be selected.

Note: If using an external clock, an external clock source should be connected to the ES-DLA-8/16 and the edge setting below is used to define whether the active edge is the positive or negative edge.

4.6 Edge

This configuration option applies when an external clock is selected as the sampling clock. It selects which edge of the incoming clock is used for the sampling of the data (positive or negative)

4.7 Data format

The ES-DLA-8/16 supports two data format modes: Raw and RLE. The user can select which mode to use.

RAW mode sends each sample individually to the software. The Run Length Encoding mode compresses consecutive samples which have the same data value. It can be more efficient where the data has a lot of repetitive values.

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5. Trigger Signal

This item opens the trigger condition editor. This provides the same function as the individual channel trigger buttons described in section 4.1.1, but provides controls for all channels at the same time.

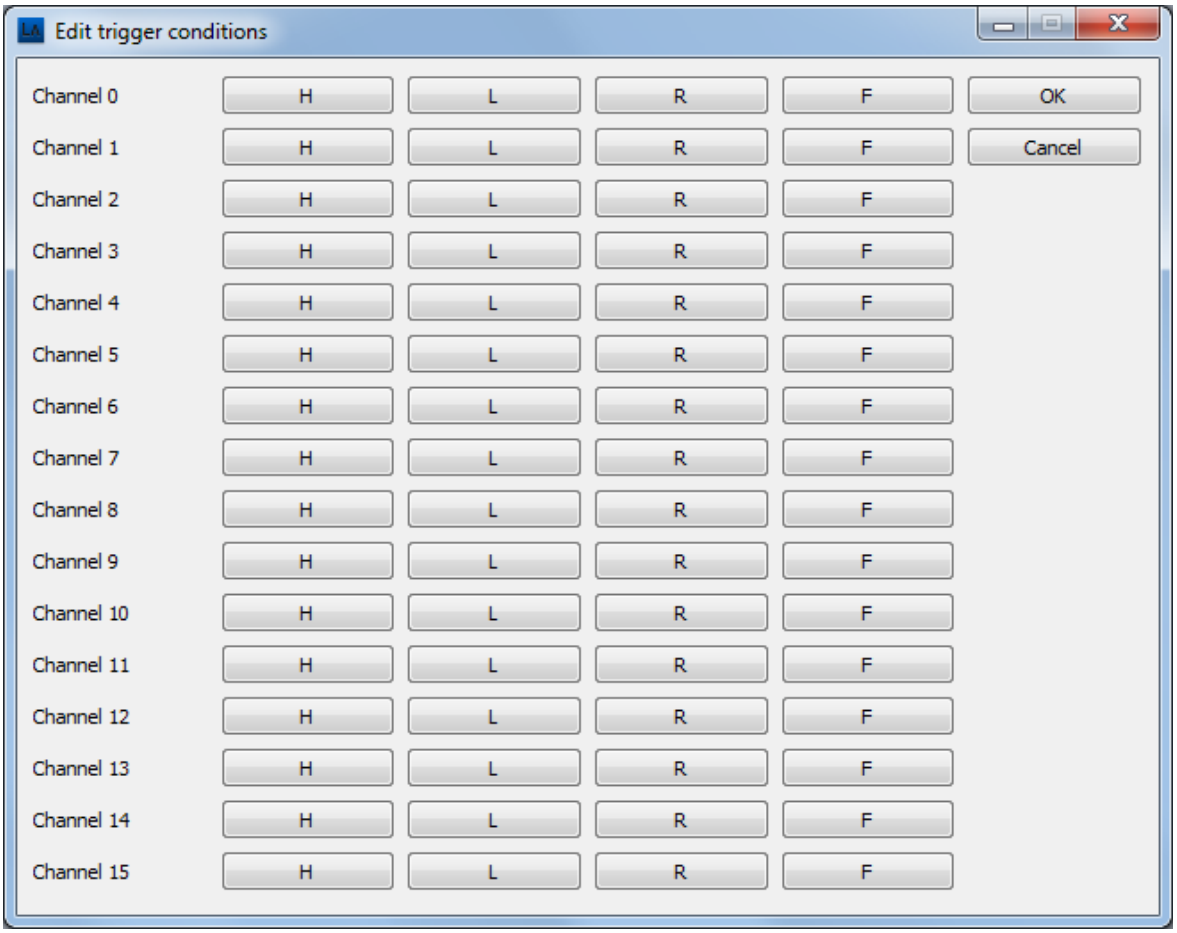

Figure 4-31 Trigger Condition Editor

H : Trigger when signal is at logically high level

L : Trigger when signal is at logically low level

R : Trigger when signal has a rising edge

F : Trigger when signal has a falling edge

6. Reset

This menu allows the application defaults to be quickly restored.

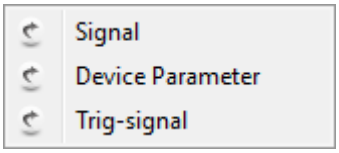

Figure 4-32 Reset Menu

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6.1 Signal

This option restores application default settings for all channel names and colors.

6.2 Device Parameter

This item restores application default settings for the device parameters.

6.3 Trig-signal

This item restores application default settings for trigger conditions, i.e., no trigger condition set.

6.4 Quick Access Menu

For quick access to the device parameters shown in this section, the buttons on the "Device Parameter Quick Access Bar" can be used.

Figure 4-33 shows the bar when used with internal clocking.

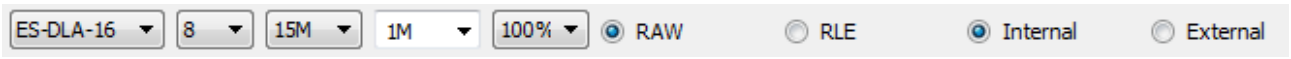

Figure 4-33 Device Parameter Quick Access Bar (1)

1. Select which connected ES-DLA-8/16 is used (in this case a 16-channel ES-DLA-16).
2. Select how many channels are used in the current capture (8 in this case).
3. Select the sample rate (15M samples / sec in this case).
4. Select how much data should be collected (1M samples in this case).
5. Select pre-trigger (in this case, 100% data is collected before the trigger).
6. Select the data format (RAW is selected)
7. Select the clock source (Internal clock is used here)

Figure 4-34 shows the bar when the external clock is enabled. An additional Negative/Positive option appears to allow the selection of the active edge.

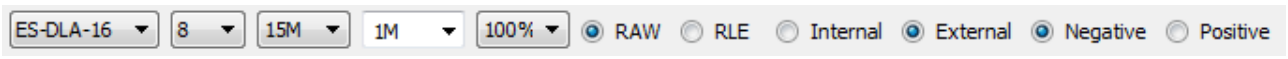

Figure 4-34 Device Parameter Quick Access Bar (2)

8. In this case, the ES-DLA-16 will do sampling at the negative edge of the external clock signal.

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4.6.4 Search Menu and Related Buttons

These functions are used to search for certain signal patterns.

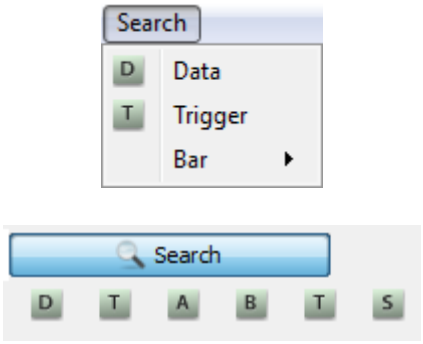

Figure 4-35 Search Menu and Buttons

1. Data

When working with bus-type data (parallel, 4-, 8-, or 16-bit type), this function can be used to search for a particular value on the bus.

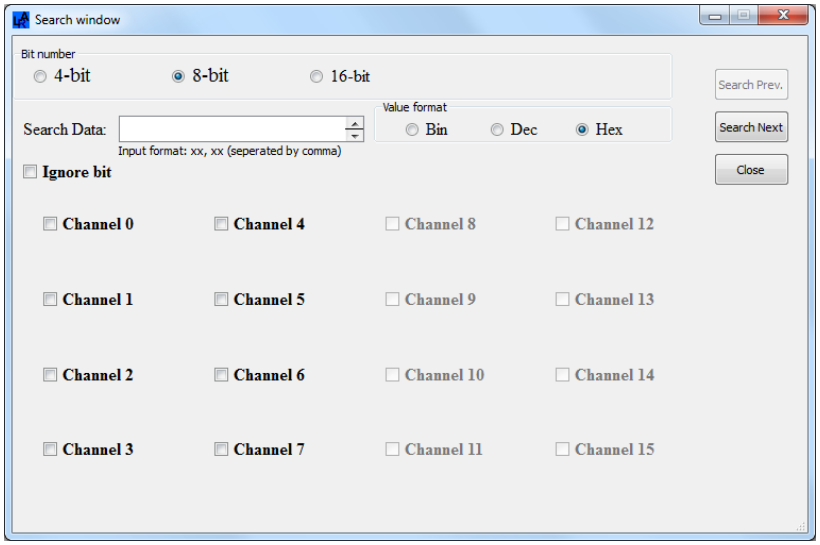

Figure 4-36 Search Data Dialog

First, select how many channels are used for the search. The setup must match the "Device" menu->"Device Parameter"->"Channel Number" setting.

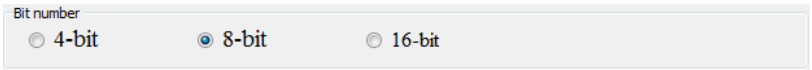

Figure 4-37 Configure Used Channel for Search

The data to be found can then be entered in the "Search Data" input box. The base type of the data value entered should also be specified (Bin, Dec, or Hex).

Figure 4-38 Search Data Input Box

The "Search Prev." or "Search Next" buttons can then be used to do a forward or backward search.

When the search is complete, the Close button allows the dialog to be closed.

Note: Sometimes, only certain bits of the data are relevant in the data to be searched for. Channels can be ignored in the search by ticking the Ignore Bit box and then selecting the channels to be ignored.

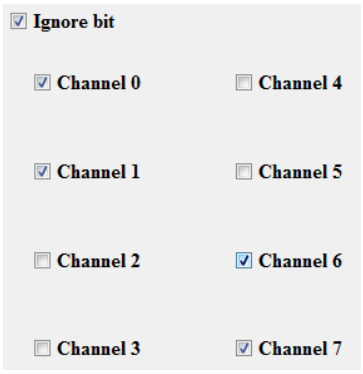

Figure 4-39 Ignore some bits in Search

2. Trigger

This function can perform search based on the signal pattern. This operates in a similar way to the setting of a trigger condition when collecting data. The Trigger Search Window will appear when this is selected from the menu.

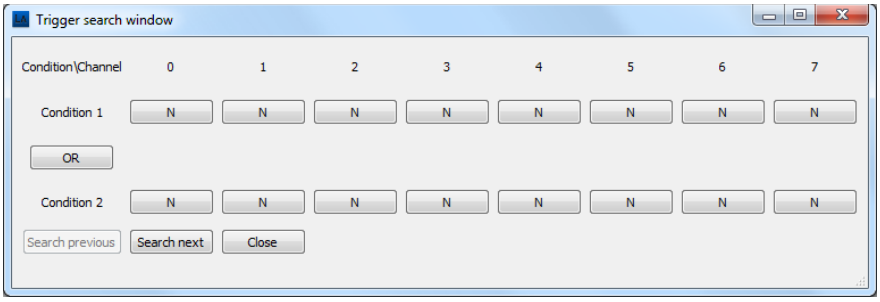

Figure 4-40 Search Signal Pattern

First, set the Condition 1 state by left-clicking the button for each channel. Each button will cycle through "N", "H", "L", "R", "F" on each click,

Then, click the OR/AND button to cycle through the OR/AND options. This defines how the two conditions are combined,

Then, set the Condition 2 state as required.

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The states for the channel condition buttons are defined below:

: Not-used channel in this search

: Search high-level state for this channel

: Search low-level state for this channel

: Search rising edge for this channel

: Search falling edge for this channel

Once the Condition 1, Condition 2, and OR/AND settings have been made, use the "Search Prev." or "Search Next" to do forward or backward searches.

Once the searching is completed, click the "Close" button to close this dialog.

When the selected trigger pattern or data is found, a search cursor will show up in the main area, to mark the data position visually.

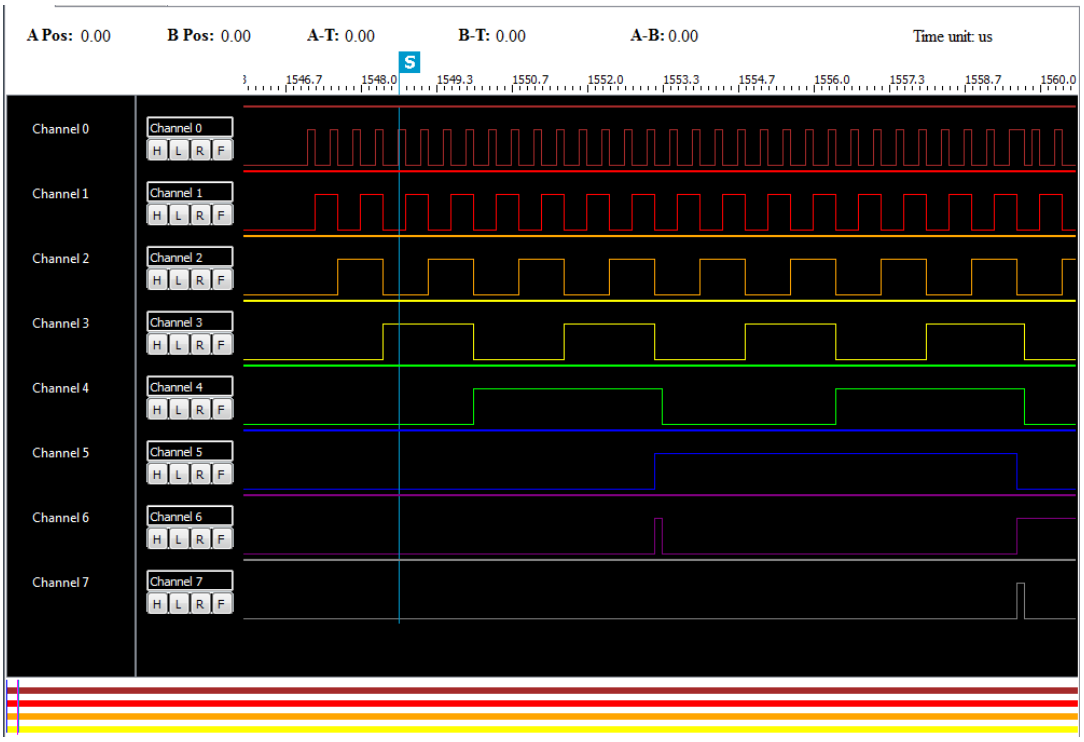

Figure 4-41 Search Cursor Marks the Expected Pattern or Data

3. Bar

This menu helps to quickly find the cursors.

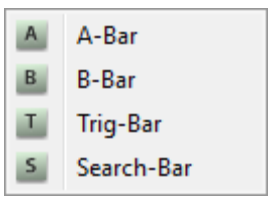

Figure 4-42 Bar Sub-menu for Cursors/Marks

3.1 A-Bar

This will move cursor A into sight.

3.2 B-Bar

This will move cursor B into sight.

3.3 Trig-Bar

If there is a trigger condition for the collected data and the trigger-point exists, this will move cursor T into sight.

3.4 Search-Bar

If a search has been performed, and the data or pattern is found, this will move cursor S into sight.

4.6.5 Protocol Analyzer and Related Buttons

This menu and related buttons allow access to the respective protocol decoders. More information can be found in section 4.5 (Protocol Analyzer).

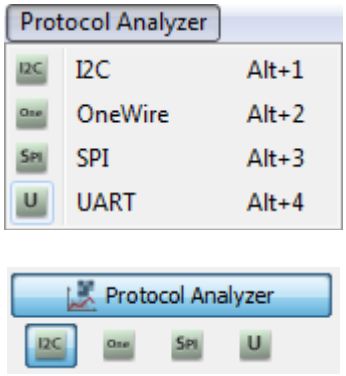

Figure 4-43 Protocol Analyzer Menu and Buttons

4.6.6 Help Menu and Related Buttons

This function provides access to the help and about information.

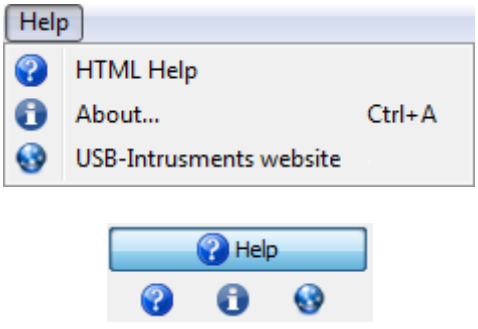

Figure 4-44 Help Menu and Buttons

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Appendix A - List of Figures

Figure 1-1: Logic Analyzer package contents 4
Figure 1-2: Logic Probe connections (ES-DLA-16 shown) and Status LED 5
Figure 1-3: Rear panel showing the USB connector 5
Figure 1-4: Front panel showing the ES-DLA-8 and ES-DLA-16 Logic Probe connectors 6
Figure 1-5: Pin names (looking into the connector as in Figure 1-4) 6
Figure 2-1 Application installer welcome screen 9
Figure 2-2 License agreement 10
Figure 2-3 Install location 10
Figure 2-4 Copy files 11
Figure 2-5 Installation completed 11
Figure 2-6 System Preferences 12
Figure 2-7 Click Security & Privacy 12
Figure 2-8 Security & Privacy 13
Figure 2-9 Input Name and Password 13
Figure 2-10 Allow 3rd party application 14
Figure 2-11 EasyLogic.dmg 14
Figure 2-12 Double click EasyLogic 15
Figure 2-13 Drag the EasyLogic to the Application of Finder 15
Figure 2-14: Connect the USB cable to the Logic Analyzer 16
Figure 2-15: Connect the USB cable to the computer 16
Figure 2-16: Connect the USB cable to the Logic Analyzer 17
Figure 2-17: Connect the USB cable to the computer 17
Figure 2-18 Found new device 18
Figure 2-19 Driver installed 18
Figure 2-20 Install driver 19
Figure 2-21 Find driver location 20
Figure 2-22 Driver installed 20
Figure 2-23: Plugging the wire harness into the analyzer 21
Figure 2-24: Connecting test clips to DUT 21
Figure 2-25: An Assembly of Laptop, Logic Analyzer, and DUT 22
Figure 3-1 Scan Device 23
Figure 3-2 Capture in progress 24
Figure 3-3 Collect Logic Data 24
Figure 3-4 Capture in progress 25

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Figure 3-5 Set Trigger Condition 25
Figure 3-6 Search Data or Signal Pattern 26
Figure 3-7 Protocol Analyzer 26
Figure 4-1 Screenshot of Main UI 27
Figure 4-2 Main Area 28
Figure 4-3 Channel name and Trigger Buttons 28
Figure 4-4 Channel Pop-up Menu 29
Figure 4-5 Change Channel Name Dialog 29
Figure 4-6 Channel Color Chooser 29
Figure 4-7 Tree view 30
Figure 4-8 Select Channels to Form a Bus 30
Figure 4-9 Combine Channels to Form a Bus 30
Figure 4-10 Expanded Tree View 31
Figure 4-11 Collapsed Bus View 31
Figure 4-12 Bus Pop-up Menu 31
Figure 4-13 Channel Pop-up Menu 32
Figure 4-14 Scale Area and Waveform 32
Figure 4-15 Waveform Pop-up Menu 32
Figure 4-16 Snapshot area 33
Figure 4-17 Protocol Analyzer 34
Figure 4-18 The Setting of I2C Decoder 35
Figure 4-19 The Setting for 1-Wire Decoder 36
Figure 4-20 The Setting of SPI Decoder 36
Figure 4-21 The Setting of UART Decoder 38
Figure 4-22 Menu and Quick Access Buttons 38
Figure 4-23 File Menu and Buttons 39
Figure 4-24 View Menu and Buttons 40
Figure 4-25 Device Menu and Buttons 41
Figure 4-26 Signal Sub-Menu 41
Figure 4-27 Channel Name and Color Setting Editor 42
Figure 4-28 Cursor Color Editor 42
Figure 4-29 Bus Management Editor 43
Figure 4-30 Device Configuration Sub-menu 43
Figure 4-31 Trigger Condition Editor 45
Figure 4-32 Reset Menu 45
Figure 4-33 Device Parameter Quick Access Bar (1) 46
Figure 4-34 Device Parameter Quick Access Bar (2) 46

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Figure 4-35 Search Menu and Buttons 47
Figure 4-36 Search Data Dialog 47
Figure 4-37 Configure Used Channel for Search 47
Figure 4-38 Search Data Input Box 47
Figure 4-39 Ignore some bits in Search 48
Figure 4-40 Search Signal Pattern 48
Figure 4-41 Search Cursor Marks the Expected Pattern or Data 49
Figure 4-42 Bar Sub-menu for Cursors/Marks 49
Figure 4-43 Protocol Analyzer Menu and Buttons 50
Figure 4-44 Help Menu and Buttons 50

Appendix B - Revision History

Version 1.0	Initial release	30th April 2013

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EasySync:
ES-DLA-8